Extreme Networks Consolidated “*e*” and “*i*” Series Hardware Installation Guide

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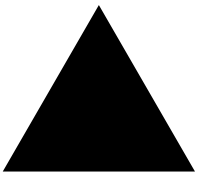


Contents

Preface

Introduction **13**

Conventions **14**

Related Publications **15**

About This Guide **16**

How To Use This Guide 16

Part 1 Common Features

Chapter 1 Common Switch Features

Software Images **21**

Full-Duplex Support **22**

Management Ports **22**

Mini-GBIC Type and Hardware/Software Support **23**

Mini-GBIC Types 23

GBIC Type and Hardware/Software Support **23**

Part 2 Site Planning

Chapter 2 Site Preparation

Planning Your Site **28**

Step 1: Meeting Site Requirements 28

Step 2: Planning for Stacking (Summit "*e*" Series Only) 28

Step 3: Evaluating and Meeting Cable Requirements 28

Step 4: Meeting Power Requirements 28

Meeting Site Requirements **28**

Operating Environment Requirements 29
Rack Specifications and Recommendations 39

Planning for Stacking 41
Maximum Switches in a Stack 41
Planning Switch Placement in the Rack 43

Evaluating and Meeting Cable Requirements 44
Cabling Standards 44
Cable Labeling and Record Keeping 45
Installing Cable 45
RJ-45 Connector Jackets 48
Radio Frequency Interference 48
Making Network Interface Cable Connections 49

Meeting Power Requirements 49
Power Supply Requirements 50
AC Power Cable Requirements 50
DC Power Requirements 51
Uninterruptable Power Supply Requirements 52

Applicable Industry Standards 53

Planning for Optical Budgets 54
Optical Budgets for Mini-GBICs 54
Long-Range GBIC System Budgets 54

Part 3 Summit Switch

Chapter 3 Summit Switch Models

Summit 200 "*e*" Series Switches 60
Summit 200 "*e*" Series Switch Features 60
Summit 200 Series Switch Physical Description 61
Summit 200 Switch LEDs 63
Console Port 63
Port Connections 64
Summit 200 Automatic Failover 64
Full-Duplex Support 65

Summit 300 "e" Series Switches 65
Summit 300 Features 66
Summit 300-24 Switch 66
Summit 300-48 Switch 70
Summit 300-48 Switch LEDs 71
Load Sharing Power Supplies 73
Summit 300 Automatic Failover 74

Summit 400 "*e*" Series Switches 75
Summit 400-24 Switches 75

Summit 400-48t switch 80
Port Connections 84
Management Port 84
Uplink Redundancy 85
Summit 400 "*e*" Series Optional Features 86

Summit "*i*" Series Switches 87
Memory Requirements 87
Port Connections 87

Summit1i Switch 88
LEDs 89
GBIC Ports 89
Power Sockets 90
Label 90
Reset Button 90
Console Port 90

Summit5i Switch 91
LEDs 92
GBIC Ports 93
Power Sockets 93
Label 93
Reset Button 93
Ethernet Management Port 94
Console Port 94

Summit7i Switch 94
LEDs 96
GBIC Ports 96
Reset Button 96
Console Port 96
Modem Port 96
Ethernet Management Port 96
PCMCIA Slot 97
Power Sockets 97
Label 97

Summit1i, Summit5i, Summit7i, and Summit48i Switch LEDs 97

Summit48i Switch 98
LEDs 99
GBIC Ports 99
Power Sockets 99
Label 100
Reset Button 100
Console Port 100

Summit48si Switch 100
LEDs 102
Mini-GBIC Ports 103

Console Port 103
Power Supplies 103
Labels 104
Reset Button 104
Summit48si Switch LEDs 105

Chapter 4 Summit Switch Installation

Installation Summary 107

Mounting the Switch in a Rack 108

Placing the Switch on a Table or Shelf 112

Installing a Summit Stacked Configuration 112
Connecting Summit 400 Series Switches 114
Connecting Summit 200 Series and Summit 300-24 Switches 114

Verifying a Successful Installation 114

Removing the Switch from a Rack 115

Chapter 5 Installing and Connecting Summit Power Supplies

Installing or Removing an External Power Supply 45019 (EPS-LD) 118
Rack-mounting the EPS-LD unit 118
Connecting the EPS-LD to the Switch 119
Connecting the EPS-LD to Power 120
Removing an EPS-LD unit 121

Installing and Removing the Internal 600 Watt AC Power Supply (15412) 121
Installing an Internal 600-Watt Power Supply 122
Removing an Internal Power Supply 123

Installing an External Power System for a Summit 400 Switch 124
Rack Mounting the EPS-T 125
Adding a Second EPS-160 to the EPS-T 126
Removing an EPS-160 from the EPS-T 126

Installing and Removing Summit48si AC Power Supplies 127
Power Supply Cords 127
Installing a Summit 48si AC Power Supply 127
Removing a Summit 48si AC Power Supply 128

Installing the AC Power Cable Retaining Bracket 129
Disconnecting a Power Cable with an Installed Cable Retaining Bracket 132

Installing the Summit48si Switch DC Power Supply 132
Preparing and Attaching the DC Power Supply Cable 134
Attaching the Connector to the DC Power Supply 135

Part 4 Alpine Switch

Chapter 6 Alpine 3800 Series Switch Models

Features **139**
Port Connections 140
Power Supplies 140
Power Supply LEDs 141
Fans 142

Alpine 3808 Switch **142**

Alpine 3804 Switch **144**

Alpine 3802 Switch **146**
Alpine 3802 Switch LEDs 148
Alpine 3802 Power Versions 148

Chapter 7 Alpine 3800 Series Chassis Installation

Installation Summary **151**

Safety Information **151**

Installing the Chassis in a Rack **152**

Grounding the Alpine 3800 Series Chassis **155**
Grounding the Alpine 3802 Chassis 156
Grounding the Alpine 3804 or 3806 Chassis 156

Removing the Chassis **157**

Chapter 8 Installing and Connecting Alpine 3800 Series Switch Power Supplies

Power Cords for the Alpine AC Power Supply **160**

Installing an Alpine 3808 or Alpine 3804 AC Power Supply **160**

Installing an Alpine 3808 or Alpine 3804 DC Power Supply **163**
Selecting and Preparing DC Cabling 163
Installing the Power Supply 164
Attaching the Cables and Supplying Power 166

Supplying Power to the Alpine 3802 DC Power Supply **167**
Selecting the Cabling 167
Attaching the Cables and Supplying Power 168

Verifying Successful Power Installation **168**

Removing the Alpine 3808 or Alpine 3804 AC Power Supply **169**

Removing the Alpine 3808 or Alpine 3804 DC Power Supply **170**

Installing the Alpine 3800 Series Switch External Power Supply **171**
Rack-Mounting the EPS-LD Unit 171
Connecting the EPS-LD to the FM-32Pi Module 172

Removing an EPS-LD Unit 174

Chapter 9 Alpine 3800 Series Switch Management Module

SMMi Memory 176
SMMi LEDs 176

Installing SMMi Modules 177
Verifying the SMMi Installation 178

Replacing SMMi Modules 178

Chapter 10 Alpine 3800 Series I/O Modules

Configuring I/O Modules 181
GM-4Ti Module 183
GM-4Xi Module 184
GM-4Si Module 186
GM-16X^3 Module 187
GM-16T^3 Module 189
FM-24Ti Module 191
FM-24SFi Module 193
FM-24MFi Module 194
FM-32Ti Module 195
FM-32Pi Module 196
FM-8Vi Module 198
WM-4T1i Module 200
WM-4E1i Module 201
WM-1T3i Module 202
I/O Module LEDs 202

Installing I/O Modules 204

Verifying the I/O Module Installation 205
LEDs 206
Displaying Slot Status Information 206

Installing External Power 206

Removing I/O Modules 206

Chapter 11 Replacing the Alpine 3800 Series Switch Fan Tray

Removing the Alpine 3808 or Alpine 3804 Fan Tray 209

Installing the Alpine 3808 or Alpine 3804 Fan Tray 211

Part 5 BlackDiamond Switch

Chapter 12 BlackDiamond 6800 Series Switch Overview

Features **215**
Port Connections 216
Fans 217
Switch Connectivity and the Backplane 217
Packet Switching and Routing 217

BlackDiamond 6816 Switch **218**

BlackDiamond 6808 Switch **222**

BlackDiamond 6804 Switch **225**

BlackDiamond Power Supplies **227**
110 VAC Power Supplies 229
DC Power Supplies 230

Chapter 13 Installing a BlackDiamond 6800 Series Switch Chassis

Installation Summary **233**

Safety Information **233**

Installing the Chassis **234**

Grounding the BlackDiamond 6800 Series Chassis **238**

Removing the Chassis **239**

Chapter 14 Installing and Connecting BlackDiamond 6800 Series Power Supplies

Preparing for Installation **241**

Installing a BlackDiamond 6800 Series AC Power Supply **243**
AC Power Cable and Plug 244
Verifying a Successful Installation 245

Replacing a BlackDiamond 6800 Series AC Power Supply **246**

Installing a BlackDiamond 6800 Series DC Power Supply **248**
Selecting and Preparing the DC Cabling 248
Attaching the Cable to the Lugs 249
Installing the Power Supply 250
Verifying a Successful Installation 250

Removing a BlackDiamond 6800 Series DC Power Supply **251**

Chapter 15 BlackDiamond 6800 Series Management Switch Fabric Module

Overview of the BlackDiamond Management Switch Fabric Module **253**
MSM Activity 255
MSM Memory 256
MSM LEDs 257

Installing MSMs **257**
Verifying the MSM Installation 260

Replacing MSMs **260**

Chapter 16 BlackDiamond 6800 Series I/O Modules

Configuring I/O Modules **263**
10GX3 Module 264
G8Ti Module 266
G8Xi Module 267
G12SXi Module 269
G16X3 Module 270
G24T3 Module 273
F48Ti Module 275
F96Ti Module 276
F32Fi Module 279
P3cSi, P3cMi, P12cSi, and P12cMi Modules 280
ARM 284
MPLS Module 287
A3cSi and A3cMi Modules 290
I/O Module LEDs 293

Installing I/O Modules **294**

Verifying the I/O Module Installation **295**
Displaying Slot Status Information 296

Replacing I/O Modules **296**

Installing XENPAK Modules **297**

Chapter 17 Replacing the BlackDiamond 6800 Series Switch Fan Tray

Removing a BlackDiamond 6800 Series Fan Tray **299**

Installing a BlackDiamond 6800 Series Fan Tray **301**

Part 6 Switch Operation

Chapter 18 Initial Switch and Management Access

Connecting Equipment to the Console Port **305**

Logging In for the First Time **306**

Part 7 Appendixes

Appendix A Safety Information

Important Safety Information **309**
Power 309

Power Cable 310
Fuse 311
Connections 311
Lithium Battery 312

Sicherheitshinweise (German) 313

Wichtige Sicherheitshinweise 313

Appendix B Switch Technical Specifications

Common Switch Specifications 315
Console Port Cables 316

Summit 200 Series Switch Specifications 318

Summit 300 Series Switch Specifications 322
Summit Switch Power Supply Specifications 323

Summit 400 Series Switch Specifications 326

Summit "*i*" Series Switch Specifications 327

Alpine 3800 Series Switch Specifications 330

BlackDiamond 6800 Series Switch Specifications 333

EPS-LD Power Supply Specifications 336

Power Connector Specifications 337

Appendix C Module Technical Specifications

GBIC Specifications 340

Mini-GBIC Specifications 343

XENPAK Specifications 344
SR XENPAK 345
LR XENPAK 345
ER XENPAK 345
ZR XENPAK 346
LX4 XENPAK 347
CX4 XENPAK 348

Alpine Modules 348

BlackDiamond Modules 357

Common Module Specifications 368

Appendix D Installing GBICs and Mini-GBICs

Installing GBICs 369
Safety Information 371
Preparing to Install or Replace a GBIC 371

Installing or Replacing a GBIC 372

Installing Mini-GBICs 373

Safety Information 373

Preparing to Install or Replace a Mini-GBIC 373

Installing or Replacing a Mini-GBIC 374

Appendix E Installing the Summit Option Card and XENPAK Modules

Installing the Summit Option Card 378

Installing a XENPAK Optical Transceiver Module 379

Removing a XENPAK Module 381

Index

Preface

This preface provides an overview of this guide, describes guide conventions, and lists other publications that might be useful.

NOTE

To ensure proper operation of your Extreme Networks equipment, read this guide before you install any Extreme Networks equipment.

Introduction

This guide provides the information needed to install an Extreme Networks® "*i*" series or "*e*" series Summit™ switch, Alpine® switch, or BlackDiamond® switch. Information is provided for the switch models shown in Table 1.

Table 1: Extreme Networks "*i*" and "*e*" series switch models

Switch Family	Switch Model
Summit 200 "*e*" series	• Summit 200-24 • Summit 200-24fx • Summit 200-48
Summit 300 "*e*" series	• Summit 300-24 • Summit 300-48
Summit 400 "*e*" series	• Summit 400-24t • Summit 400-24p • Summit 400-48t
Summit "*i*" series	• Summit1i • Summit5i • Summit7i • Summit48i • Summit48si

Table 1: Extreme Networks "*i*" and "*e*" series switch models (Continued)

Switch Family	Switch Model
Alpine 3800 "*i*" series	• Alpine 3802 • Alpine 3804 • Alpine 3808
BlackDiamond 6800 "*i*" series	• BlackDiamond 6804 • BlackDiamond 6808 • BlackDiamond 6816

This guide contains information about site location, switch functionality, and switch operation. It is intended for use by network administrators who are responsible for installing and setting up network equipment. It assumes a basic working knowledge of:

- Local Area Networks (LANs)
- Ethernet concepts
- Ethernet switching and bridging concepts
- Routing concepts
- Simple Network Management Protocol (SNMP)

See the *ExtremeWare Software User Guide* for information about configuring an Extreme Networks switch.

NOTE

If the information in the Release Notes shipped with your switch differs from the information in this guide, follow the Release Notes.

Conventions

Table 2 and Table 3 list conventions used throughout this guide.

Table 2: Notice icons

Icon	Notice Type	Alerts you to...
	Note	Important features or instructions.
	Caution	Risk of personal injury, system damage, or loss of data.
	Warning	Risk of severe personal injury.

Table 3: Text conventions

Convention	Description
`Screen displays`	This typeface represents information as it appears on the screen, or command syntax.
`Screen displays bold`	This typeface represents commands that you type.
The words “enter” and “type”	When you see the word “enter” in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says “type.”
[Key] names	Key names appear in text in one of two ways: • Referenced by their labels, such as “the Return key” or “the Escape key” • Written with brackets, such as [Return] or [Esc] If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press [Ctrl]+[Alt]+[Del].
Words in *italicized* type	Italics emphasize a point of information or denote new terms at the place where they are defined in the text.

Related Publications

The Extreme Networks switch documentation set includes:

- *Extreme Networks Consolidated “i” and “e” Series Hardware Installation Guide* (this guide)
- *ExtremeWare Software User Guide*
- *ExtremeWare Software Command Reference Guide*
- *ExtremeWare Release Notes*

Documentation for Extreme Networks products is available from the Extreme Networks website at the following location:

http://www.extremenetworks.com/services/documentation/

You can select and download the following Extreme Networks documentation from the Documentation section of the Services page:

- Release Notes (you must have a valid service contract to access the release notes)
- Software User Guides
- Hardware User Guides
- White Papers
- Troubleshooting Tools
- Preventive Maintenance
- Instructional Videos
- Archives

About This Guide

This guide describes how to prepare your site and how to install, maintain, and operate your Extreme Networks switch. It contains information about features that are common to all switches, as well as switch-specific features. This guide contains seven parts:

- Common Features—Describes features that are shared by the Extreme Networks family of switches. This section describes software images, full-duplex support, management ports, and mini-GBIC and GBIC modules.
- Site Planning—Describes how to evaluate, plan, and determine the location of your Extreme Networks switch.
- Summit Switch—Describes the features that are specific to the Summit switch. This section provides an overview of the Summit switches, information about model types, descriptions of features, and installation instructions.
- Alpine Switch—Describes the features that are specific to the Alpine switch. This section provides an overview of the Alpine switch, information about model types, descriptions of features, and installation instructions.
- BlackDiamond Switch—Describes the features that are specific to the BlackDiamond switch. This section provides an overview of the BlackDiamond switch, information about model types, descriptions of features, and installation instructions.
- Switch Operation—Describes how to power on any Extreme Networks switch, verify the switch installation, connect equipment to the console port, and log in to the switch for the first time.
- Appendixes—Include information about safety requirements, technical specifications, and specialized installation instructions.

How To Use This Guide

Each chapter of this guide contains information about how to successfully operate your Extreme Networks switch. The chapters with *Summit*, *Alpine*, or *BlackDiamond* in the titles contain information that is applicable only to that family of switch. All other chapters are applicable to any Extreme Networks "*i*" series or "e" series switches.

Switch-Specific Information

For switch-specific information, be sure to read the applicable switch-specific chapter. For example, if you have a BlackDiamond switch and you need to remove and replace an I/O module, see "Replacing I/O Modules" in Chapter 16 for details about how to remove and replace an I/O module in a BlackDiamond chassis.

Common Information

For items applicable to any Extreme Networks switch, make sure you read the appropriate chapter. For example, to learn how to prepare your site for installing your Extreme Networks equipment, see Chapter 2, "Site Preparation."

Reference Information

This guide contains appendixes that describe:

- Switch safety issues
- Switch specifications
- Module specifications
- Installation procedures for accessory equipment

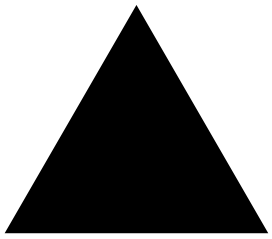
Appendix A, “Safety Information” describes important safety issues such as power, power cables, and fuses.

Appendix B, “Switch Technical Specifications” is organized according to the family of switch: Summit, Alpine, and BlackDiamond. This appendix describes switch specifications such as physical dimensions, weight, certifications, and power supply parameters. Information that is common to all “*i*” series and “e” series switches is described at the end of the appendix.

Appendix C, “Module Technical Specifications” is organized according to the family of switch and modules available for that switch, and describes module specifications such as physical dimensions, weight, and standards. Information that is common to all “*i*” series and “e” series modules is described at the end of the appendix.

Appendix D, “Installing GBICs and Mini-GBICs” describes how to install GIBICs and mini-GBCS in Extreme Networks switches and modules.

Appendix E, “Installing the Summit Option Card and XENPAK Modules” describes how to install the Summit Option Card and associated XENPAK modules to add high-performance uplink ports to the switch.



Part 1
Common Features

1 Common Switch Features

This chapter describes the features that are shared in common by the Extreme Networks family of switches. The following topics are described in detail:

- Software Images on page 21
- Full-Duplex Support on page 22
- Management Ports on page 22
- Mini-GBIC Type and Hardware/Software Support on page 23
- GBIC Type and Hardware/Software Support on page 23

Extreme Networks switches that run on ExtremeWare include three product families: the Summit series, Alpine series, and BlackDiamond series. They are divided into the "*i*" series and "*e*" series switches, based on the chipset used in the switches. Available in a range of physical sizes and configurations, these switches provide a wide variety of connection types and network services support. The Summit switches are self-contained units that offer fixed ports and slots for installing Gigabit Ethernet Connectors (GBICs) and mini-GBICs. The Alpine and BlackDiamond switches are chassis-based switches with slots for installing management modules and a wide variety of I/O modules.

The combination of BlackDiamond, Alpine, and Summit switches delivers a consistent end-to-end network solution that provides a nonblocking architecture, wire-speed switching, wire-speed IP routing, and policy-based Quality of Service (QoS).

Software Images

When you receive a new Extreme Networks switch, be aware that an ExtremeWare® software image and a BootROM image have been preinstalled at the factory. To verify the software image you are running on your switch, use the `show version` CLI command. The `show version` command displays the hardware and software versions currently running on the switch. To ensure that you have the latest software and BootROM image, go to the support login portion of the Technical Support page at:

http://www.extremenetworks.com/services/

If your switch is running ExtremeWare version 6.2 or later, the Power LED activity is different from previous versions of ExtremeWare. All other LED activity is the same. See Table 4 for more information about the Power LED activity on switches running ExtremeWare version 6.2 or later.

Table 4: Power LED activity for switches running ExtremeWare version 6.2 or later

LED	Color	Indicates
Power LED	Green	The indicated power supply unit (PSU) is powered up.
	Amber	A PSU is installed, but not connected to power.
	Off	The PSU is not receiving power or no PSU is present.

NOTE

If the information in the Release Notes that shipped with your switch differs from the information in this guide, follow the Release Notes.

Full-Duplex Support

Extreme Networks switches provide full-duplex support for all ports. This means that frames can be transmitted and received simultaneously, which, in effect, doubles the bandwidth that is available on a link. Most ports on an Extreme Networks switch autonegotiate for half-duplex or full-duplex operation. Gigabit Ethernet and 100BASE-FX ports operate in full-duplex mode only in accordance with technical standards.

Management Ports

The 10/100BASE-TX Ethernet management port allows you to communicate directly to the CPU of the switch. You can plug an Ethernet cable directly from your laptop into the management port. This provides you with direct access into the switch and allows you to view and locally manage the switch configurations.

Do not assign an in-band IP address to the Ethernet management port VLAN. The management port VLAN is an out-of-band VLAN, so if it is assigned an in-band IP address (an address where the source and destination are in the same subnet), the switch will treat it as a normal VLAN and attempt to route traffic through it.

An Ethernet management port is located on the following Extreme Networks devices:

- Summit5i—The management port is located on the back of the switch.
- Summit7i—The management port is located on the front of the switch.
- Summit 400-48t—The management port is located on the back of the switch.
- Alpine—Switch Management Module (SMMi) for the Alpine series switch.
- BlackDiamond—Management Switch Fabric Module (MSM64i) for the BlackDiamond series switch.

Extreme Networks does not recommend that you use the management port to route traffic to any front panel port on the switch. The management port is designed for switch management purposes.

Mini-GBIC Type and Hardware/Software Support

The Summit48si and Summit "*e*" series switches, the BlackDiamond G16X^3 module, and the Alpine GM-16X^3 module support the small form pluggable (SFP) GBIC, also known as the mini-GBIC. The switches and the modules identify the type of mini-GBIC that is installed and verify that the mini-GBIC is an Extreme Networks-certified mini-GBIC.

Mini-GBIC Types

Mini-GBICs are Class 1 laser devices that operate at 3.3 V.

The following types of mini-GBIC interfaces are available for these switches:

- SX mini-GBIC, which conforms to the 1000BASE-SX standard
- LX mini-GBIC, which conforms to the 1000BASE-LX standard
- ZX mini-GBIC, which conforms to the IEEE 802.3z standard
- 1000BX bi-directional mini-GBIC, which conforms to the IEEE 802.3ah 1000BASE-BX10 standard
  - 1000BASE-BX-D, 1490 nm TX/1310 nm RX wavelength
  - 1000BASE-BX-U, 1310 nm TX/1490 nm RX wavelength

Use only Extreme Networks-certified mini-GBICs, available from Extreme Networks, in the mini-GBIC port of the switch or module.

Specifications for the mini-GBICs are in Appendix C, "Module Technical Specifications".

Instructions to install mini-GBICs are in Appendix D, "Installing GBICs and Mini-GBICs".

GBIC Type and Hardware/Software Support

Most Extreme Networks switches support two types of GBICs: the Parallel ID GBIC and the Serial ID GBIC. The switch can identify the media type for the GBIC that is installed. Initial ExtremeWare software versions do not support Serial ID GBICs. If Serial ID GBICs are installed in a switch with an initial software release, the switch will not bring up the link on GBIC ports.

GBICs are available in the following media types:

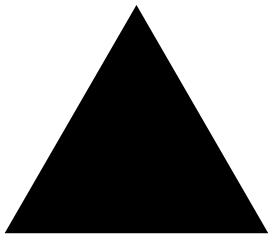
- SX
- LX, LX70, and LX100
- ZX
- UTP

Specifications for the GBICs, including media types and optical specifications, are in Appendix C, "Module Technical Specifications". Instructions to install GBICs are in Appendix D, "Installing GBICs and Mini-GBICs".

NOTE

Extreme Networks optics are tested to work in all supported Extreme Networks switches. We recommend that all customers use Extreme Networks optics in their Extreme Networks switches.

Extreme Networks assumes no liability for 3rd party optics. While Extreme Networks does not block 3rd party optics, we cannot ensure that all 3rd party optics operate properly in all Extreme Networks switches. The customer assumes all risks associated with using 3rd party optics in Extreme Networks switches.



Part 2
Site Planning

2 Site Preparation

This chapter describes how to prepare your site for installing Extreme Networks equipment. It contains information about environmental and cabling requirements, power requirements, and building and electrical code organizations.

This chapter includes these sections:

- Planning Your Site on page 28
- Meeting Site Requirements on page 28
- Planning for Stacking on page 41
- Evaluating and Meeting Cable Requirements on page 44
- Meeting Power Requirements on page 49
- Applicable Industry Standards on page 53
- Planning for Optical Budgets on page 54

The requirements described in this chapter are intended for the system administrator, network equipment technician, or network manager who is responsible for installing and managing the network hardware. It assumes a working knowledge of local area network (LAN) operations, and a familiarity with communications protocols that are used on interconnected LANs. Installation, maintenance, and removal of a switch, chassis, or its components must be done by qualified service personnel only.

Qualified service personnel have had appropriate technical training and experience that is necessary to be aware of the hazards to which they are exposed when performing a task and of measures to minimize the danger to themselves or other people.

By carefully planning your site, you can maximize the performance of your existing network and ensure that it is ready to migrate to future networking technologies.

To learn more about safety issues and to ensure safety compliance, see Appendix A.

WARNING!

Read the safety information in Appendix A thoroughly before installing your Extreme Networks switch. Failure to follow this safety information can lead to personal injury or damage to the equipment.

Planning Your Site

To install your equipment successfully, you should plan your site carefully. The site planning process has four major steps:

Step 1: Meeting Site Requirements

Your physical installation site must meet several requirements for a safe and successful installation:

- Building and electrical code requirements
- Environmental, safety, and thermal requirements for the equipment you plan to install
- Distribution rack requirements

Step 2: Planning for Stacking (Summit "*e*" Series Only)

If you will be installing Summit "e" series switches in a stacked configuration, make sure you have the appropriate cables for the interconnections. To use the dedicated stacking ports on the back of the Summit 400 series switches, you must have a special cable that is available from Extreme Networks.

Step 3: Evaluating and Meeting Cable Requirements

After examining your physical site and ensuring all environment requirements are met, you should evaluate and compare your existing cable plant with the requirements of the Extreme Networks equipment to determine if you need to install new cables (or cabling).

Step 4: Meeting Power Requirements

To run your equipment safely, you must meet the specific power requirements for the Extreme Networks equipment that you plan to install.

NOTE

Review the safety information before you begin installing the equipment. be sure to follow all safety recommendations during the installation process.

Meeting Site Requirements

This section addresses the various requirements to consider when preparing your installation site, including:

- Operating Environment Requirements
- Rack Specifications and Recommendations

Operating Environment Requirements

Verify that your site meets all environmental and safety requirements.

Virtually all areas of the United States are regulated by building codes and standards. During the early planning stages of installing or modifying your LAN, it is important that you develop a thorough understanding of the regulations that pertain to your location and industry.

Building and Electrical Codes

Building and electrical codes vary depending on your location. Comply with all code specifications when planning your site and installing cable. The following sections are provided as a resource to obtain additional information.

Three major building codes are:

- Uniform Building Code—produced by the International Conference of Building Officials (ICBO); 5360 South Workman Mill Road; Whittier, California 90601 USA. www.icbo.org
- BOCA Basic Building Code—produced by the Building Officials and Code Administrators (BOCA) International, Inc.; 4051 West Flossmoor Road; Country Club Hills, Illinois 60478 USA. www.bocai.org
- Standard Building Code (SBC)—produced by the Southern Building Code Congress International, Inc.; 900 Montclair Road; Birmingham, Alabama 35213 USA. www.sbcci.org

Five authorities on electrical codes are:

- National Electrical Code (NEC) Classification (USA only)—a recognized authority on safe electrical wiring. Federal, state, and local governments use NEC standards to establish their own laws, ordinances, and codes on wiring specifications. The NEC classification is published by the National Fire Protection Association (NFPA). The address is NFPA; 1 Batterymarch Park; Quincy, Massachusetts 02269 USA. www.nfpa.org
- Underwriters' Laboratory (UL) (USA only)—an independent research and testing laboratory. UL evaluates the performance and capability of electrical wiring and equipment to determine whether they meet certain safety standards when properly used. Acceptance is usually indicated by the words "UL Approved" or "UL Listed." The address is UL; 333 Pfingsten Road; Northbrook, Illinois 60062-2096 USA. www.ul.com
- National Electrical Manufacturing Association (NEMA) (USA only)—an organization of electrical product manufacturers. Members develop consensus standards for cables, wiring, and electrical components. The address is NEMA; 2101 L Street N.W.; Washington, D.C. 20037 USA. www.nema.org
- Electronics Industry Association (EIA)—a trade association that develops technical standards, disseminates marketing data, and maintains contact with government agencies in matters relating to the electronics industry. The address is EIA; 2001 Eye Street N.W.; Washington, D.C. 20006 USA. www.eia.org
- Federal Communications Commission (FCC)—a commission that regulates all interstate and foreign electrical communication systems that originate in the United States according to the Communications Act of 1934. The FCC regulates all U.S. telephone and cable systems. The address is FCC; 1919 M Street N.W.; Washington, D.C. 20554 USA.

Wiring Closet Considerations

You should consider the following recommendations for your wiring closet:

- Ensure that your system is easily accessible for installation and service. See “Rack Specifications and Recommendations” on page 39 for specific recommendations.
- Use appropriate AC or DC power for your switch. Foe more information about power requirements, see “Meeting Power Requirements” on page 49.
- Use a vinyl floor covering in your wiring closet. (Concrete floors accumulate dust, and carpets can cause static electricity.)
- Prevent unauthorized access to wiring closets by providing door locks. Install the equipment in a secured, enclosed, and restricted-access area, ensuring that only qualified service personnel have access to the equipment.
- Provide adequate overhead lighting for easy maintenance.
- Ensure that each wiring closet has a suitable ground. All distribution racks and equipment installed in the closet should be grounded.
- Ensure that all system environmental requirements are met, such as ambient temperature and humidity.

NOTE

Extreme Networks recommends that you consult an electrical contractor for commercial building and wiring specifications.

Temperature. Extreme Networks equipment generates a significant amount of heat. It is essential that you provide a temperature-controlled environment for both performance and safety.

Install the equipment only in a temperature- and humidity-controlled indoor area that is free of airborne materials that can conduct electricity. Too much humidity can cause a fire. Too little humidity can produce electrical shock and fire.

The following are some general thermal recommendations for your wiring closet:

- Ensure that the ventilation in the wiring closet is adequate to maintain a temperature below 104° F (40° C).
- Install a reliable air conditioning and ventilation system.
- Keep the ventilation in the wiring closet running during nonbusiness hours; otherwise, the equipment can overheat.
- Maintain ambient operating temperature: 32° to 104° F (0° to 40° C)
- Maintain storage Temperature: -40° to 158° F (-40° to 70° C)

NOTE

Like all electrical equipment, switch product lifetimes degrade with increased temperature. If possible, temperatures should be kept at approximately 78° F (25° C) or lower.

For more information about monitoring temperature and preventing overheating conditions, see “Monitoring Airflow Temperatures and Handling Overheating” on page 36.

BlackDiamond 6816 Spacing Requirements. Due to chassis-to-chassis heating, Extreme Networks recommends placing no more than three BlackDiamond 6816 chassis next to each other.

The following are some general recommendations for installing your BlackDiamond 6816 chassis:

- A minimum of 17.32 inches (44 cm) between each set of three BlackDiamond 6816 chassis.

  Or

- Place front-back cooled equipment, such as a BlackDiamond 6808 chassis, between each set of three BlackDiamond 6816 chassis.

  Or

- Place patch panels, which are used to patch cables together, between each set of three BlackDiamond 6816 chassis. A patch panel does not require any power and does not generate any heat.

NOTE

Up to five adjacent BlackDiamond 6816 chassis will continue to function without safety concerns. However, product lifetime may degrade with continued exposure to high temperatures in close proximity and long term reliability may be compromised.

Airflow Requirements. Cooling of an Extreme Networks switch requires proper airflow through the chassis. Make sure there is space around the installed switch for airflow and that cables or other equipment do not block the air intake or outflow vents on the Extreme Networks switches. It is best to have 3 to 5 inches (7.62 to 12.7 cm) of clear space in front of the air intake and outflow vents on the switches. Depending on other conditions in the equipment room or wiring closet, it may be possible to install the switches closer to each other. Consult your Extreme Networks Customer Support representative for guidance.

For proper airflow through the switch, leave clear space around the switch as follows:

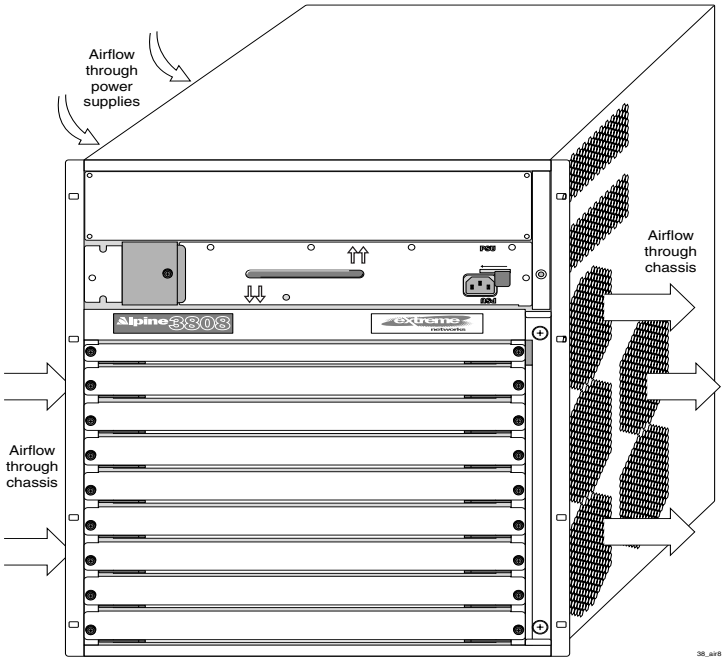
- Summit family of switches—left and right sides of the switch
- Alpine 3800 series chassis—left and right sides of the switch
- BlackDiamond 6816 and 6804 chassis—around the entire chassis (front, rear, and sides)
- BlackDiamond 6808 chassis—front and rear of the chassis

The airflow of the Summit family of switches moves from the left side of the switch to the right side of the switch, or from the right side of the switch to the left side of the switch depending on the model.

The airflow of the Alpine 3808 moves through the power supplies and is independent of the airflow through the chassis as shown in Figure 1. For example, if the power supply fans fail, the airflow through the module area of the chassis will not cool down the power supplies.

- Airflow for cooling power supplies enters the top of the chassis and moves left to right as you face the chassis.
- Airflow for cooling modules moves left to right as you face the chassis.

Figure 1: Airflow through the Alpine 3808 chassis



The airflow of the Alpine 3804 and Alpine 3802 moves from the left side of the chassis to the right side of the chassis as shown in Figure 2 and Figure 3.

- Airflow for cooling power supplies moves left to right as you face the chassis.
- Airflow for cooling modules moves left to right as you face the chassis.

Figure 2: Airflow through the Alpine 3804 chassis

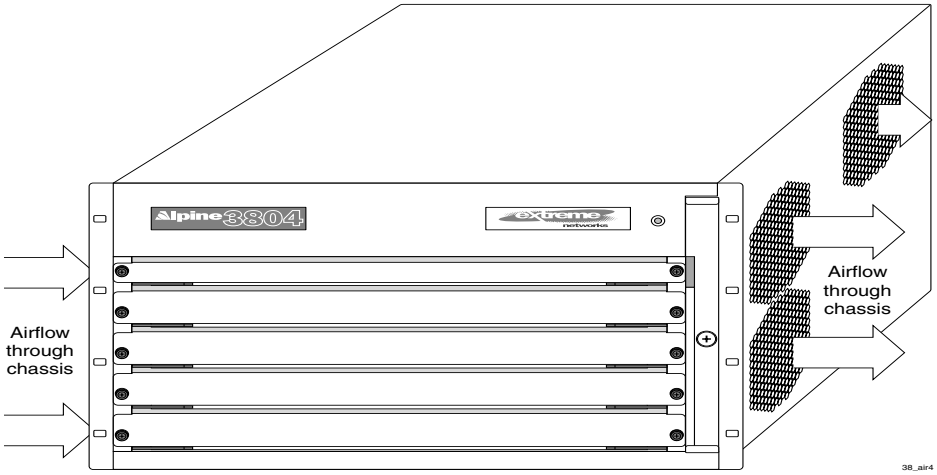
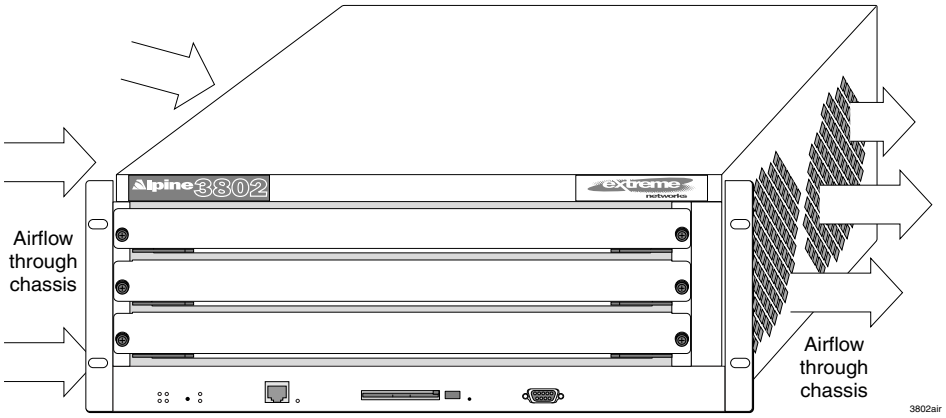


Figure 3: Airflow through the Alpine 3802 chassis



The airflow of the BlackDiamond 6800 series chassis moves through the power supplies and is independent of the airflow through the modules as shown in Figure 4, Figure 5, and Figure 6. For example, if the power supply fans fail, the airflow through the module area of the chassis will not cool down the power supplies.

- Airflow for cooling power supplies moves front to back as you face the chassis.
- Airflow for cooling modules moves left to right as you face the chassis.

Figure 4: Airflow through the BlackDiamond 6816 chassis

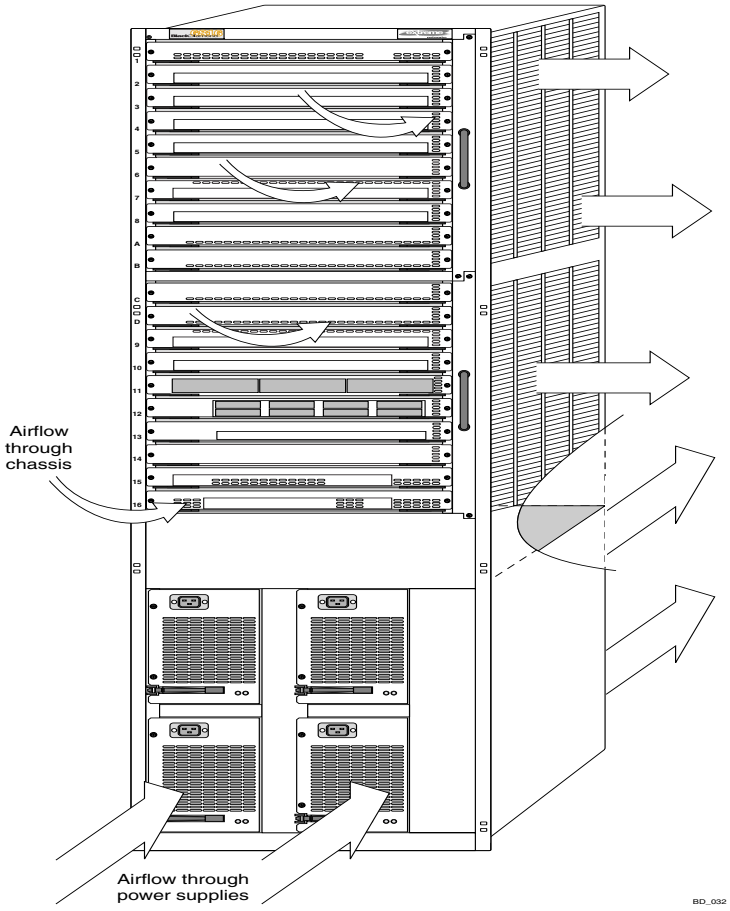


Figure 5: Airflow through the BlackDiamond 6808 chassis

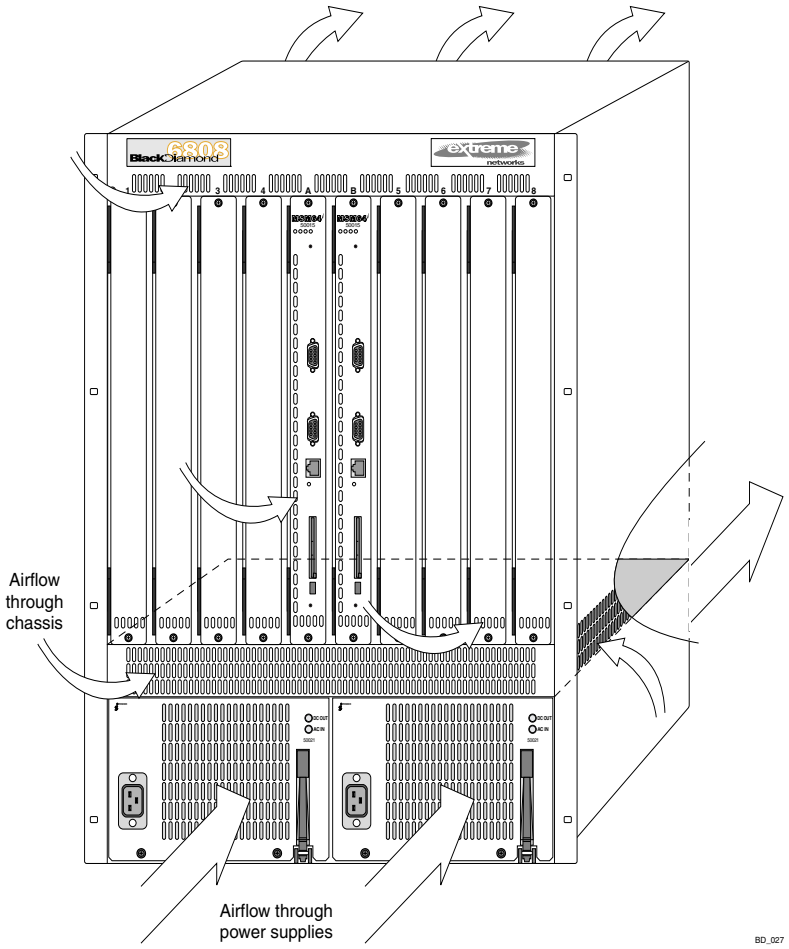
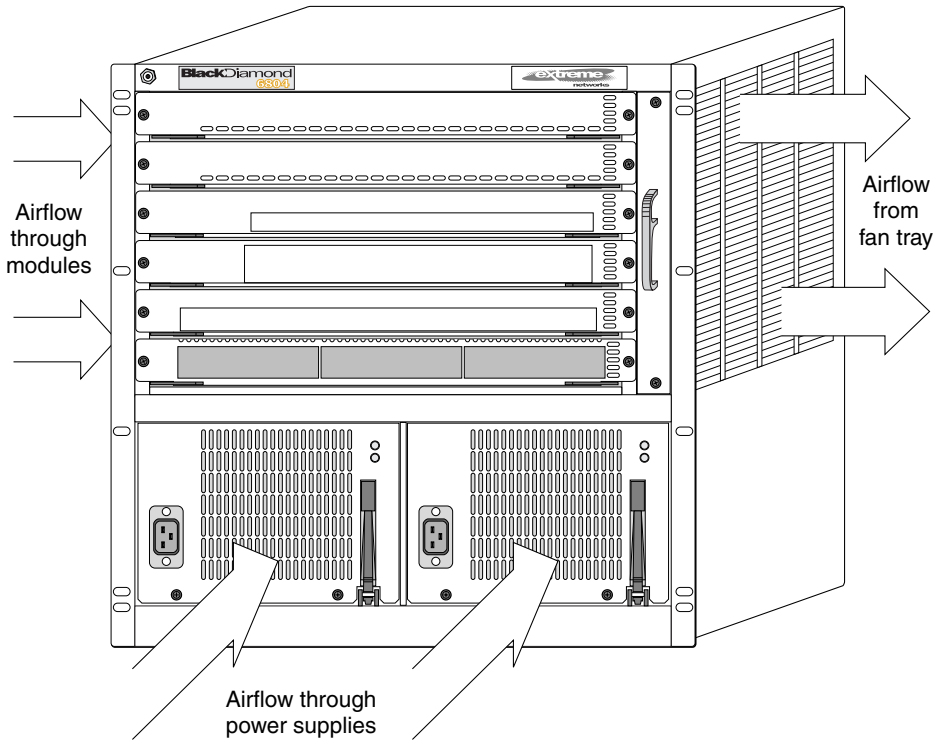


Figure 6: Airflow through the BlackDiamond 6804 chassis



Humidity. Operating humidity should be kept between 10 and 95% relative humidity (noncondensing).

Monitoring Airflow Temperatures and Handling Overheating

ExtremeWare provides a temperature logging function that allows the regular capturing of system temperature to the system log. The `enable logging-temperature` command reports the internal temperature (as reported in the temperature sensors on the active master MSM in the chassis) in the system and logs temperature readings hourly in the system log. Additionally, general status is reported through the `show switch` command. For more information about using these commands, see the *ExtremeWare Software User Guide* and the *ExtremeWare Software Command Reference Guide*.

The active master MSM reports the temperature captured by ExtremeWare. While temperature sensors are located on every module in the system, only the active MSM master controls the reporting for the system. An overheating condition will be reported if a system temperature sensor detects a temperature of 55° C or above.

NOTE

A module's temperature sensor reading is normally +/- 5° C compared to the ambient temperature measured around the equipment.

Automatic Shutdown in an Overheating Condition. The power supply controls the overheating shutdown condition in the system. The power will shut down at approximately 85° C (+/- 5° C) as reported on an independent temperature sensor within the power supply.

NOTE

Note that automatic shutdown is based solely on the power supply temperature sensor and is not based on the temperature sensor of the MSM. The power supply temperature sensor readings are not visible through the ExtremeWare command set. This protection is designed to prevent thermal runaway conditions, and does not ensure the protection of the system modules. Internal temperatures above 55° C (+/- 5° C) can produce a decline in the long-term reliability of the system overall.

The system will recover automatically once the temperature has dropped to 80° C as tracked by the independent temperature sensor within the power supply. The temperature sensor remains active when the system is in a shutdown state.

System Alarms in an Overheating Condition. Extreme supports the following SNMP alarms to report overheating conditions:

- **Over Temperature Alarm:** This trap sends notification of an overheating condition, but takes no action. The alarm threshold is fixed at 55° C; however, you can control the alarm by turning it ON or OFF.
- **Overheat:** This is a trap sent before the system is taken offline. It indicates that the onboard temperature sensor has reported an overheating condition. The system will shut down until the unit has cooled sufficiently. A cold start trap will be issued when the unit has come back online.

You can use the ExtremeWare command set to capture temperature logs on an hourly basis. However, the traps on the system are not configurable.

You can use these traps to trigger an SNMP management platform to react with an external program to perform programmed actions to remedy the situation. For example, you could shut down power by using a remote power management device available from a third party. The actions performed depend on both the capability of the management platform and any third-party device that can be set to control the flow of power to the switch.

Monitoring Overheating Symptoms. In general, any system reporting temperatures above 40° C should be closely monitored. You should take the following actions:

- Use the ExtremeWare command set to enable temperature logging and monitor for any rises or decline in temperature in the system logs.
- Ensure proper environment conditions as described earlier in this section.

  Environmental conditions with especially poor airflow can severely impact system performance. Numerous racks to the left and right of the system being monitored can result in the system being cooled by the exhaust of another system or influenced by the heat emitted from the adjoining systems. In addition, enclosed racks can prevent proper airflow. Poor environment placement of this type can typically result in as much as a 10° C increase to the ambient temperature (that is, the temperature of the environment around the switch) being fed to the system.
- Check airflow into and out of the system, ensuring appropriate spacing for proper air circulation.
- Verify that any additional equipment installation has not blocked airflow.
- Check fans to ensure that there has not been a slowdown or failure of fan operation.
- Ensure that proper blank faceplates are used for all open slots.

  Openings in a chassis can result in air eddies in the system, resulting in regions of the system operating at higher temperatures.

Excessive temperature can cause various symptoms to appear on a unit. Once a system has failed due to overheating, it should be carefully monitored to ensure that a system component or module has not been compromised. The following symptoms can indicate additional problems that require further analysis:

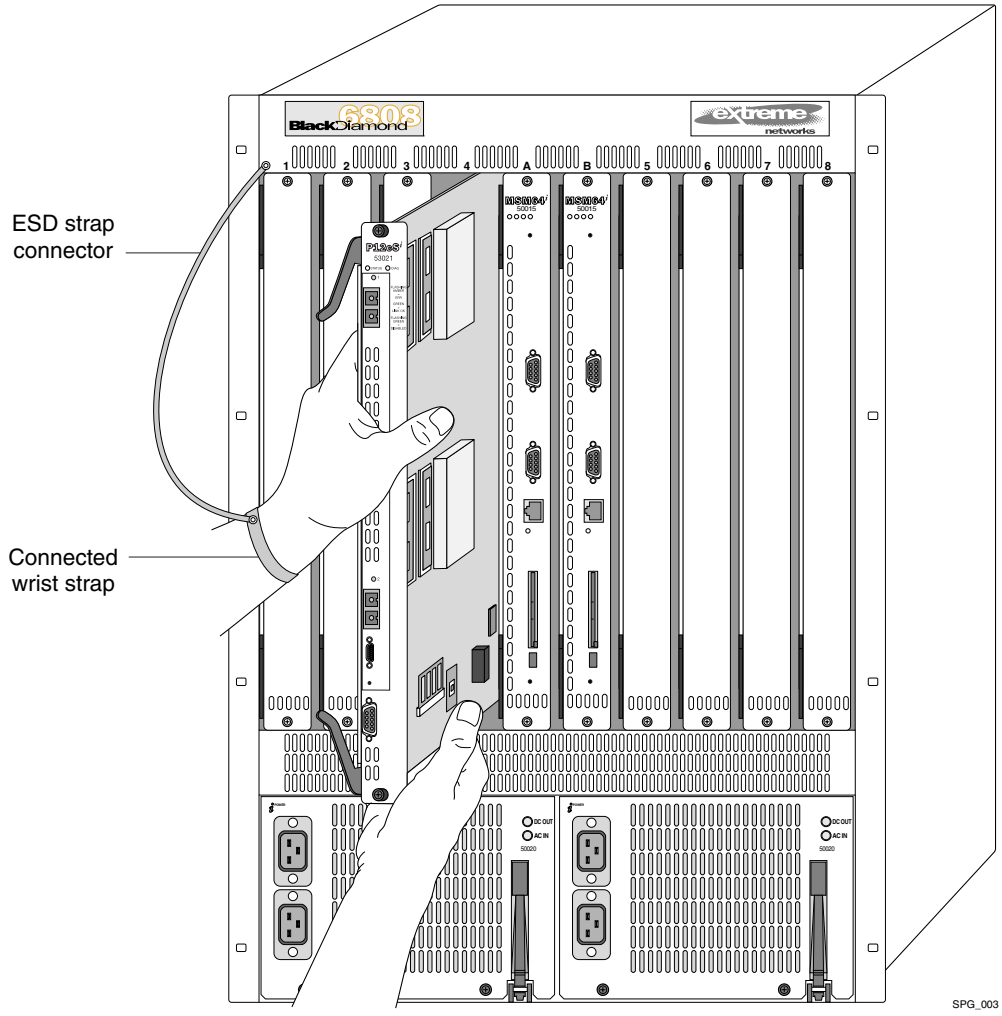
- **Checksum errors:** Increased temperature can damage sensitive components resulting in an increased degradation of internal circuit reliability. This could result in errors being reported within the switch fabric itself. Checksum errors of various types (e.g., p-bus, int, external, CPU) can start appearing in small quantities at temperatures in excess of 40° C as reported by ExtremeWare commands.
- **System reboot:** The system may reboot to recover to a normal state based on the hardware configuration. A reboot considered in isolation is not a common symptom of temperature damage; however, viewed in conjunction with excessive error reporting it may indicate such damage. Rebooting can occur if checksum errors result in an interruption of core switch command processing.
- **Decreased System Reliability:** While immediate issues may not arise on system recovery, an overheating condition within a system may affect the system's long-term reliability.

Electrostatic Discharge (ESD)

Your system must be protected from static electricity. Take the following measures to ensure optimum system performance:

- Keep relative humidity at 50 to 70%.
- Remove materials that can cause electrostatic generation (such as synthetic resins) from the wiring closet. Check the appropriateness of floor mats and flooring.
- Connect conductors (metals, etc.) to ground, using dedicated grounding lines.
- Use electrostatically safe equipment and the ESD straps that are provided with your equipment. All Alpine and BlackDiamond switches come with ESD wrist strap connectors and wrist straps as shown in Figure 7.

Figure 7: Using an ESD wrist strap when handling switch components



Rack Specifications and Recommendations

Racks should conform to conventional standards. In the United States, use EIA Standard RS-310C: Racks, Panels, and Associated Equipment. In countries other than the United States, use IEC Standard 297. In addition, verify that your rack meets the basic mechanical and space requirements that are described in this section.

Mechanical Recommendations for the Rack

Use distribution racks that meet the following mechanical recommendations:

- Use an open style, 19-inch (48.26 cm) rack to facilitate easy maintenance and to provide proper ventilation.
- The rack should use the universal mounting rail hole pattern that is identified in IEC Standard 297.
- The mounting holes should be flush with the rails to accommodate the chassis.
- Use a rack made of steel or aluminum.

- Install equipment into the lower half of the rack first to avoid making the rack top-heavy.
- The rack should support approximately 600 pounds (272 kilograms).

Protective Grounding for the Rack (Alpine and BlackDiamond Switches)

Adequate grounding for Summit switches is provided through the power cord. No additional grounding of the rack is required. For Alpine and BlackDiamond switches, follow the recommendations in this section.

Use a rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground.

All Extreme Networks switches are designed with mounting brackets that provide solid metal-to-metal connection to the rack. If you do not use equipment racks, you can attach wiring terminals directly to the mounting brackets for appropriate grounding. Alpine and BlackDiamond products have grounding terminals that are mounted on the back of the chassis.

At a minimum, follow these guidelines:

- Ground equipment racks to earth ground.
  - — Use the same gauge copper wire for grounding as that used for the power input cable.
  - — Drill and tap wire terminals to equipment racks.
  - — Position the earth ground as close to the equipment rack as possible to maintain the shortest wiring distance possible.
  - — Use a ground impedance tester or micro-ohm meter to test the quality of earth ground connection at the chassis. This will ensure good grounding between the chassis, rack, and earth ground.

NOTE

Because building codes vary worldwide, Extreme Networks strongly recommends that you consult an electrical contractor to ensure proper equipment grounding is in place for your specific installation.

- Ground DC power supplies to earth ground by using the grounding terminals provided.

Space Requirements for the Rack

Provide enough space in front of and behind the switch so that you can service it easily. Allow a minimum of 48 inches (122 cm) in front of the rack and 24 inches (61 cm) behind the rack. When using a relay rack, provide a minimum of 24 inches (61 cm) of space behind the mounted equipment. Extra room on each side is optional.

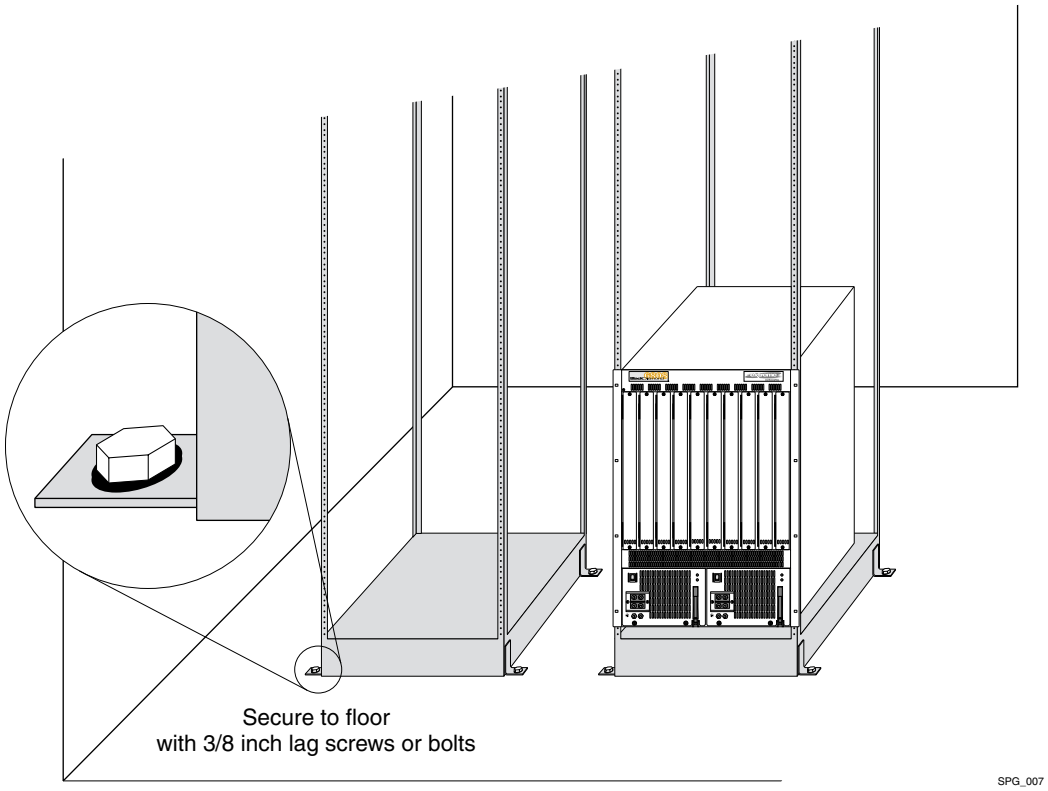
NOTE

Install your equipment rack near an easily accessible power outlet. When you need to disconnect the power cable from your switch, remove it first from the power source and then from the switch.

Securing the Rack

The rack should be attached to the wiring closet floor with 3/8 inch (9.5 mm) lag screws or equivalent hardware. The floor under the rack should be level within 3/16 inch
(5 mm). Use a floor-leveling cement compound if necessary or bolt the racks to the floor as shown in Figure 8.

Figure 8: Properly secured rack



Brace open distribution racks if the channel thickness is less than 1/4 inch (6.4 mm).

Planning for Stacking

Summit "*e*" series switches can be installed in a stacked configuration that is managed as one switching entity. The Summit 200 and 300 series switches use the Gigabit Ethernet ports on the front of the switch as the stacking connectors for interconnecting to other switches in a stacked configuration. The Summit 400 series switches use dedicated stacking ports on the back of the switch. When you plan a stacked configuration, you must take into account:

- The number and types of switches in the stack.
- The placement of switches in the stack. Summit 400 series switches should be adjacent to each other.
- Software versions running on the switch. If the major version number is different between switches in a stack, the stack will not come up. For more information about stack operation, see the *ExtremeWare User Guide* and *ExtremeWare Command Reference Guide*.

Maximum Switches in a Stack

Although software supports up to eight switches in a stack, certain hardware restrictions do not allow stacking eight units of some types. Each switch type is assigned a platform weight or slot budget to be used in determining the total number of switches allowed in the stack. The Summit 400 series switches also have an assigned platform weight for installed 10-gigabit dual uplink ports (Summit XEN or XGM-2xn Option Card). Table 5 lists the platform weights.

Table 5: Summit switch platform weights for stacking

Platform	Platform Weight
Summit 200-24	1
Summit 200-24fx	1
Summit 200-48	2
Summit 300-24	1
Summit 400-24	2
Summit 400-48	4
10-gigabit option card	2

The sum of all platform weights in the stack must be no greater than 32. The total number of switches must be no greater than 8.

Example 1: How many Summit 400-48t switches with no installed XEN or XGM 10-Gigabit option cards can be in a stack?

Platform weight for the Summit 400-48t = 4

Let the number of switches = x

$4 * x = 32$
$x = 32 \div 4 = 8$

The maximum number of Summit 400-48t switches in a stack is 8.

Example 2: How many Summit 400-48t switches with installed XEN or XGM 10-Gigabit option cards can be in a stack?

Platform weight for the Summit 400-48t = 4

Platform weight for one 10-gigabit option card = 2

Let the number of switches = x

$(4 * x) + (2 * 2) = 32$
$4 * x = 28$
$x = 28 \div 4 = 7$

The maximum number of Summit 400-48t switches with installed 10-Gigabit option cards in a stack is 7.

Example 3: Stacking eight Summit 400 series switches with Summit XEN option cards.

In a stack with two Summit 400-48 switches containing Summit XEN cards to provide high-speed 20-Gbps uplinks, how many Summit 400-24 switches can be added to the stack?

Platform weight for Summit 400-48 = 4

Platform weight for Summit XEN option card = 2

Platform weight for the Summit 400-24 = 2

Let the supported number of slots of Summit 400-24 switches in this configuration = y

Sum of all platform weights:

[2 * (weight of Summit 400-48)] + [2 * (weight of XEN card)] + [y * (weight ot Summit 400-24)] ≤ 32
(2 * 4) + (2 * 2) + (y * 2) ≤ 32
y ≤ 10

Because software supports only up to eight switches in a stack, the total maximum number of Summit 400 series switches in a stack is 8. Two Summit 400-48 switches are already installed; therefore, six Summit 400-24 switches can be in the stack.

Planning Switch Placement in the Rack

The Summit 200 and 300 series switches use the 1-gigabit Ethernet ports on the front of the switch as stacking ports. The Summit 400 series switches have dedicated stacking ports on the back of the switch. If you are mixing switch types in a stack, keep the following in mind:

- If only Summit 200 and 300 series switches are in the stack, all stacking connections happen at the front of the switch using the 1-gigabit Ethernet ports.
- If only Summit 400 series switches are in the stack, stacking connections happen at the back of the switch using the Extreme Networks-specified stacking cable and the dedicated stacking ports.
- Stacking Summit 200 or 300 series switches with Summit 400 series switches is not supported.

Figure 9 shows a typical stacked configuration using Summit 400 series switches, and Figure 9 shows a typical stacked configuration using Summit 200 and 300 series switches. For more information about stacking, see the *ExtremeWare User Guide*.

Figure 9: Typical Summit 400 series stacked configuration

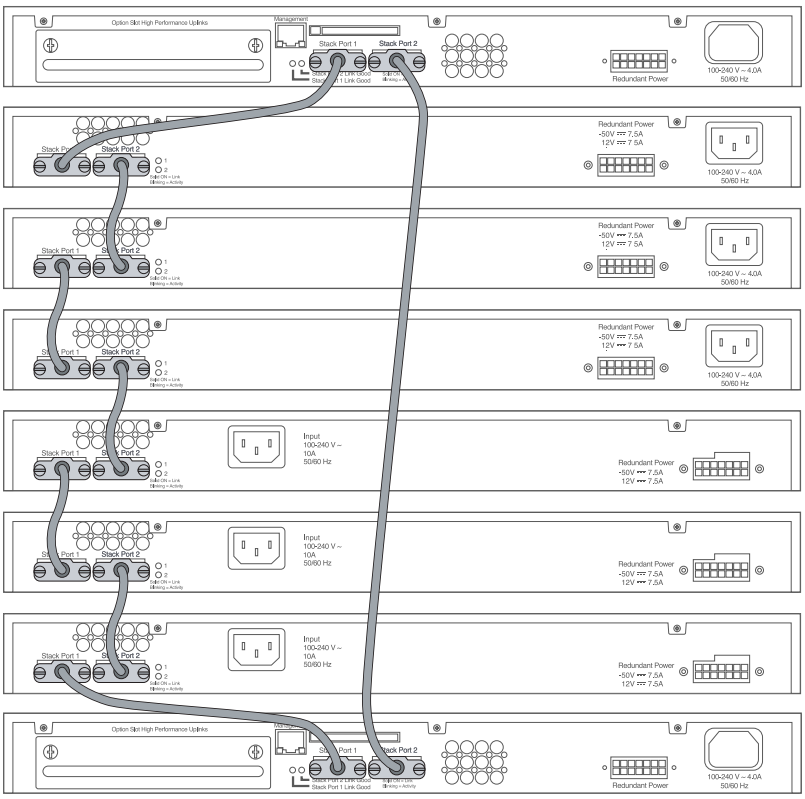
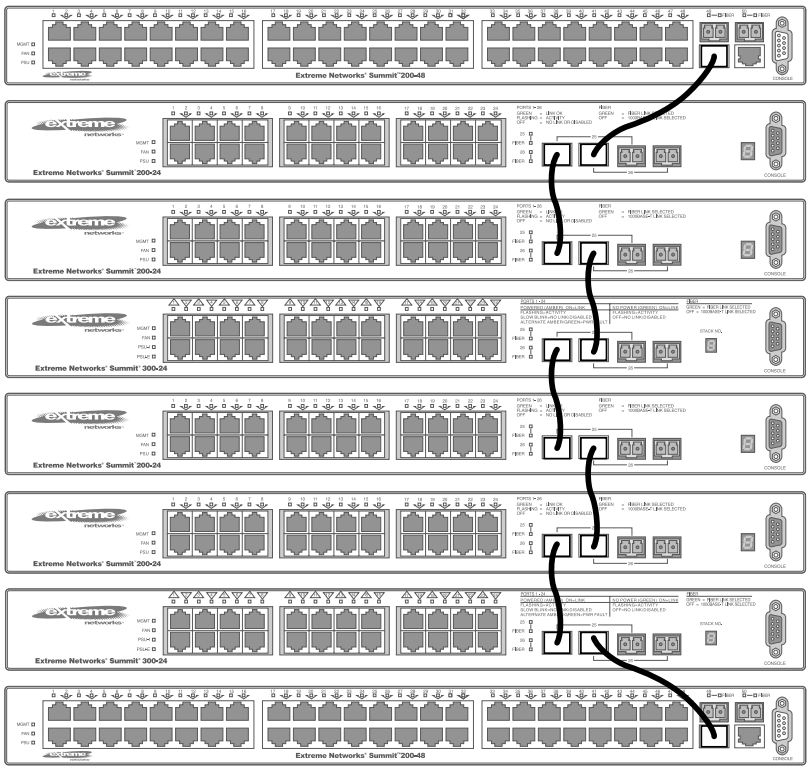


Figure 10: Typical Summit 200 and 300 stacked configuration



EW75002

Evaluating and Meeting Cable Requirements

This section addresses requirements for the cables used when installing your network equipment. It includes:

- Cabling Standards on page 44
- Cable Labeling and Record Keeping on page 45
- Installing Cable on page 45
- RJ-45 Connector Jackets on page 48
- Radio Frequency Interference on page 48
- Making Network Interface Cable Connections on page 49

Cabling Standards

We recommend using the BICSI (Building Industry Consulting Service International) RCDD (Registered Communications Distribution Designer), which is globally recognized as a standard in site planning and cabling. For information, go to http://www.bicsi.org

Cable Labeling and Record Keeping

A reliable cable labeling system is essential when planning and installing a network. Maintaining accurate records helps you to:

- Relocate devices easily.
- Make changes quickly.
- Isolate faults in the distribution system.
- Locate the opposite end of any cable.
- Know the types of network devices that your cabling infrastructure can support.

Consider the following recommendations when setting up a cable labeling system suitable for your installation:

- Identify cables by securely attaching a label to all cable ends.
- Assign a unique block of sequential numbers to the group of cables that run between each pair of wiring closets.
- Assign a unique identification number to each distribution rack.
- Identify all wiring closets by labeling the front panel of your Extreme Networks equipment and other hardware.
- Keep accurate and current cable identification records.
- Post records near each distribution rack. Include the following cable drop information: the cable source, destination, and jumper location.

Installing Cable

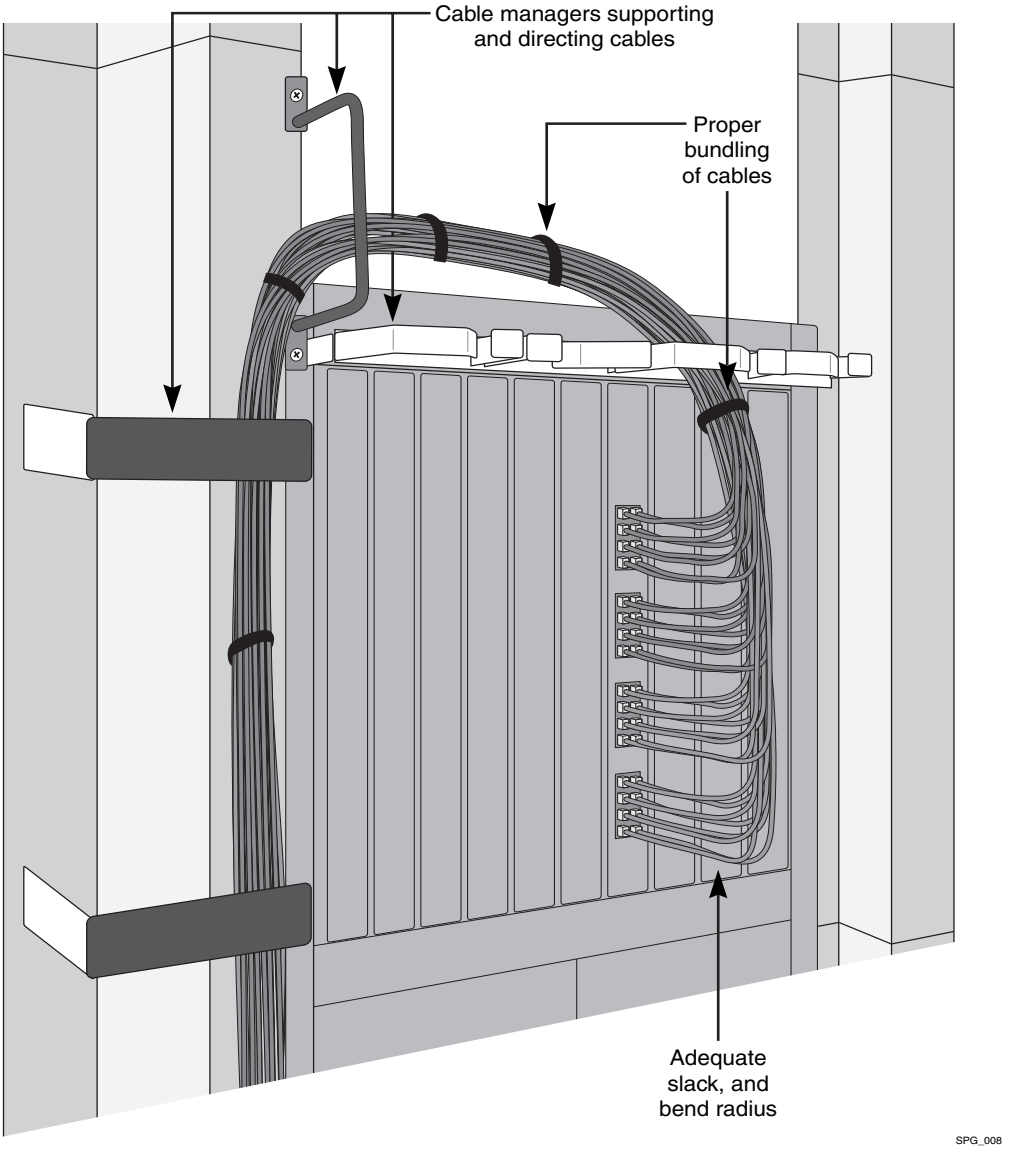
Consider the following recommendations when you connect cable to your network equipment:

- Examine cable for cuts, bends, and nicks.
- Support cable using a cable manager that is mounted above connectors to avoid unnecessary weight on the cable bundles.
- Use cable managers to route cable bundles to the left and right of the network equipment to maximize accessibility to the connectors.
- Provide enough slack—approximately 2 to 3 inches (5.08-7.62 cm)— to provide proper strain relief as shown in Figure 11.
- Bundle cable using velcro straps to avoid injuring cables.
- If you build your own cable, ensure that cable is properly crimped.
- When installing a patch panel using twisted pair wiring, untwist no more than 1 inch (2.54 cm) of the cable to avoid RF interference.
- When required for safety and fire rating requirements, use plenum-rated cable. See your local building codes for determining when it is appropriate to use plenum-rated cable, or refer to IEC standard 850.
- Keep all ports and connectors free of dust.

NOTE

Unshielded twisted pair (UTP) cable can build up ESD charges when being pulled into a new installation. Before installing category 5 UTP cables, discharge ESD from the cable by plugging it into a port on a switch or any network device that is not powered on.

Figure 11: Properly installed and bundled cable



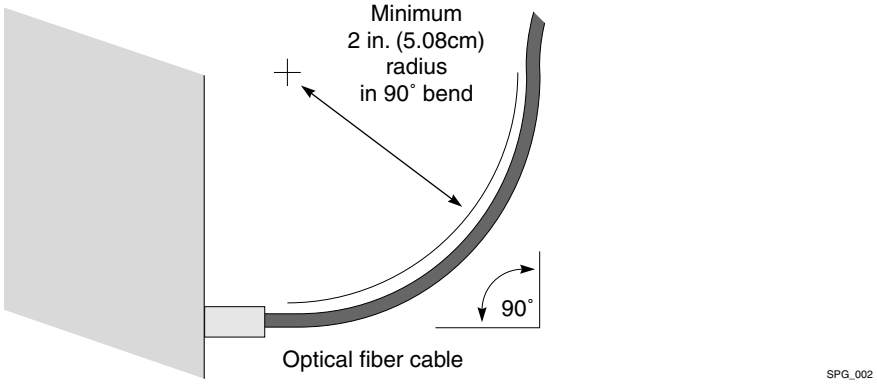
Fiber Optic Cable

Fiber optic cable must be treated gently during installation. Every cable has a minimum bend radius, for example, and fibers will be damaged if the cables are bent too sharply. It is also important not to stretch the cable during installation. We recommend that the bend radius for fiber optic cable equals 2-inch (5.08 cm) minimum for each 90 degree turn as shown in Figure 12.

NOTE

Kinks and sharp bends can destroy or impair the cable's ability to convey light pulses accurately from one end of the cable to the other. Use care in dressing the optical-fiber cables: provide satisfactory strain relief to support the cable and maintain an adequate bend radius at all cable turns, particularly where the cable connects to the I/O module.

Figure 12: Bend radius for fiber optic cable



Cable Distances

Table 6 shows cable media types and maximum distances that support reliable transmission in accordance with international standards except where noted.

Table 6: Media types and maximum distances

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
1000BASE-SX (850 nm optical window)	50/125 µm multimode fiber	400	500
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	160	220
	62.5/125 µm multimode fiber	200	275
1000BASE-LX (1300 nm optical window)	50/125 µm multimode fiber	400	550
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	500	550
	10/125 µm single-mode fiber	–	5,000
	10/125 µm single-mode fiber*	–	10,000
1000BASE-LX70 (1550 nm optical window)	10/125 µm single-mode fiber	–	70,000
100BASE-FX (1300 nm optical window)	50/125 µm multimode fiber	400	2000
	50/125 µm multimode fiber	500	2000
	62.5/125 µm multimode fiber	400	2000
	62.5/125 µm multimode fiber	500	2000

Table 6: Media types and maximum distances (Continued)

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
1000BASE-T	Category 5 and higher UTP cable	–	100
100BASE-TX	Category 5 and higher UTP cable	–	100
10BASE-T	Category 3 and higher UTP cable	–	100

* Proprietary to Extreme Networks. Connections between two Extreme Networks 1000BASE-LX interfaces that use 10/125 µm single-mode fiber can use a maximum distance of 10,000 meters.

RJ-45 Connector Jackets

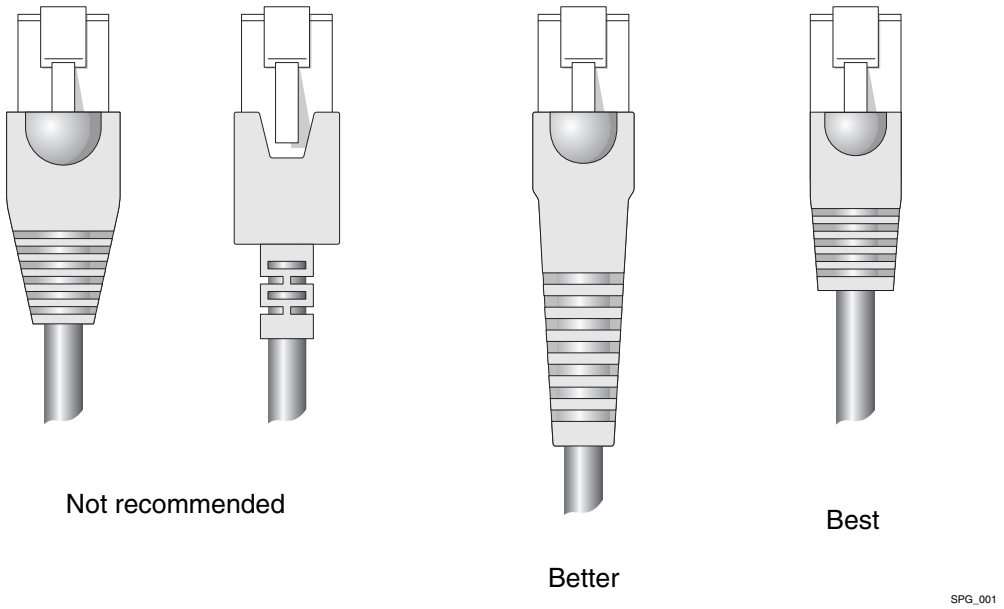
Use cable with RJ-45 connector jackets that are flush with the connector or that have connectors with a no-snag feature.

Using cable with jackets that are wider than the connectors can cause:

- Connectors that are not properly aligned with the port.
- Crowded cable installation, which can cause connectors to pop out of the port.

Figure 13 shows examples of connector jacket types that are not recommended as well as those that are recommended.

Figure 13: RJ-45 connector jacket types



Radio Frequency Interference

If you use unshielded twisted pair (UTP) cabling in an installation, take precautions to avoid radio frequency (RF) interference. RF interference can cause degradation of signal quality, and, in an Ethernet

network environment, can cause excessive collisions, loss of link status, or other physical layer problems that can lead to poor performance or loss of communication.

To prevent RF interference, avoid the following devices or situations:

- Attaching UTP cable to AC power cables
- Routing UTP cable near antennas, such as a Ham radio antenna
- Routing UTP cable near equipment that could exhibit RF interference, such as:
  - ARC welding equipment
  - Electrical motors that contain coils
  - Air conditioner units
  - Electrical transformers

In areas or applications where these situations cannot be avoided, use fiber optic cabling or shielded twisted pair cabling (STP).

NOTE

Because harmonics can appear on the neutral line of a typical three-phase power circuit, Extreme Networks recommends using a harmonics meter in new installations.

Making Network Interface Cable Connections

Use the appropriate type of cable to connect the ports of your switch to another switch or router.

Working carefully, one port at a time, follow these steps:

1. Verify that you have identified the correct cable for the port.
2. Use an alcohol wipe or other appropriate cleaning agent to clean the cable connectors; make sure they are free of dust, oil, and other contaminants.
3. If you are using optical-fiber cable, align the transmit (Tx) and receive (Rx) connectors with the correct corresponding connectors on the switch or the I/O module.

   On the ATM and PoS modules, the transmit (Tx) connector on each port is the top connector.
4. Press the cable connectors into their mating connectors on the switch or I/O module until the cable connector is firmly seated.
5. Repeat steps 1 through 4 for the remaining cables on this or other switches or I/O modules.
6. Dress and secure the cable bundle to provide appropriate strain relief and protection against bends and kinks.

Meeting Power Requirements

This section discusses power requirements, including:

- Power Supply Requirements
- AC Power Cable Requirements
- Uninterruptable Power Supply Requirements

For more information about the power specifications of the Extreme Networks family of switches, see Appendix B, “Switch Technical Specifications”.

Power Supply Requirements

Adhere to the following requirements in order to operate your Extreme Networks equipment safely:

- Make sure your equipment is placed in an area that accommodates the power consumption and component heat dissipation specifications.
- Make sure your power supply meets the site power, AC power, or DC power requirements of the network equipment.
- Make sure DC connections are made by an on-site electrician.

NOTE

For power specifications for Extreme Networks products, see the Extreme Networks website at http://www.extremenetworks.com.

- When connecting power to installed equipment, avoid connecting through an extension cord or power strip.
- If your switch includes more than one power supply, connect each power supply to different, independent power sources. If a power source fails, it will only affect the switch power supply to which it is connected. If all switch power supplies are connected to a single power source, the entire switch is vulnerable to a power source failure.

AC Power Cable Requirements

Use an AC power cable appropriate for your country. Check your local electrical codes and regulatory agencies for power cable requirements. The countries listed in Table 7 and Table 8 have the additional requirements.

Table 7: General AC power cable requirements

Country	Requirements
USA and Canada	• The cable set must be UL-approved and CSA-certified. to the rated input power requirements of the product, • The minimum specification for the flexible cable is Type SVT or SJT, 3-conductor. • The cable set must have a rated current capacity of at least the amount rated for each specific product.
Denmark	The supply plug must comply with section 107-2-D1, standard DK2-1a or DK2-5a.
Switzerland	The supply plug must comply with SEV/ASE 1011.
Argentina	The supply plug must comply with Argentinian standards.

NOTE

When using dual power supplies, make sure that each AC power supply attaches to an independent power source.

Table 8: AC power receptacle requirements

Switch Type	Country	Requirements
Alpine/Summit	North America	15 A service receptacle, NEMA 5-15 for 110/220 VAC power supplies.
Alpine/Summit	United Kingdom	10 A service receptacle, BS 1363 for 110/220 VAC power supplies.
Alpine/Summit	International	10 A service receptacle, CEE 7/7 for 110/220 VAC power supplies.
Alpine/Summit	Australia	10 A service receptacle, AS 3112 for 110/220 VAC power supplies.
Alpine/Summit	Japan	15 A service receptacle, JIS 8303 for 110/220 VAC power supplies.
BlackDiamond	North America	20 A service receptacle, NEMA L5-20 (locking) for BlackDiamond 110 VAC power supplies.
BlackDiamond	North America	20 A service receptacle, NEMA L6-20 (locking) for BlackDiamond 220 VAC power supplies.
BlackDiamond	International	16 A/20 A service receptacle, IEC 60309 for BlackDiamond 220 VAC power supplies.
BlackDiamond	North America	20 A service receptacle, NEMA 5-20 (non-locking) for BlackDiamond 110 VAC power supplies.
BlackDiamond	North America	20 A service receptacle, NEMA 6-20 (non-locking) for BlackDiamond 220 VAC power supplies.
BlackDiamond	International	16 A service receptacle, CEE 7/7 for BlackDiamond 220 VAC power supplies.
BlackDiamond	Australia	15 A service receptacle, 036 for BlackDiamond 220 VAC power supplies.

DC Power Requirements

Table 9 lists DC power requirements for Extreme switches.

Table 9: DC power requirements

Switch Type	Country	Requirements
Alpine	International	• Use 30 A at -40 V DC (or equivalent power between -40 and -70 V DC) for Alpine DC power supplies. • For Alpine DC power and ground cables, use: — 8 AWG, high strand-count copper wire cable (Alpine 3808) — 10 AWG, high strand-count copper wire cable (Alpine 3804) — 14 AWG, high strand-count copper wire cable (Alpine 3802)
BlackDiamond	International	• Use 55 A service for BlackDiamond DC power supplies. • For BlackDiamond DC power cables, use 4 AWG, high strand-count copper wire cable.
Summit48si	International	• • For the Summit48si DC power cable, use the three-wire harness that was shipped with the Summit48si switch and power supply.

Uninterruptable Power Supply Requirements

An uninterruptible power supply (UPS) is a device that sits between a power supply (such as a wall outlet) and a device (such as a switch) to prevent outages, sags, surges, and bad harmonics from adversely affecting the performance of the device.

UPS Features

A UPS traditionally can perform the following functions:

- Absorb relatively small power surges.
- Smooth out noisy power sources.
- Continue to provide power to equipment during line sags.
- Provide power for some time after a blackout has occurred.

In addition, some UPS or UPS plus software combinations provide the following functions:

- Automatic shutdown of equipment during long power outages.
- Monitoring and logging of power supply status.
- Display the voltage (current draw) of the equipment.
- Restart equipment after a long power outage.
- Display the voltage currently on the line.
- Provide alarms on certain error conditions.
- Provide short circuit protection.

Selecting a UPS

To determine UPS requirements for your switch, ask these questions:

- What are the amperage requirements?
- What is the longest potential time period that the UPS would be required to supply backup power?
- Where will the UPS be installed?
- What is the maximum transition time that your installation will allow?

NOTE

Extreme Networks recommends that you use a UPS that provides online protection.

Calculating Amperage Requirements

To determine the size of UPS that you need, use the following procedure:

1. To find VA (Volt-Amps), locate the voltage and amperage requirements for each piece of equipment. These numbers are usually located on a sticker on the back or bottom of your equipment. Then multiply the numbers together to get VA:

   VA = Volts x Amperes

2. Add the VA from each piece of equipment together to find the total VA requirement.

   To determine the minimum amperage requirements for your UPS, we recommend that you add 30% to the total.

UPS Transition Time

Transition time is the time that is necessary for the UPS to transfer from utility power to full-load battery power. For Extreme Networks products, a transition time of less than 20 milliseconds is required for optimum performance.

Applicable Industry Standards

For more information, see the following ANSI/TIA/EIA standards:

- ANSI/TIA/EIA-568-A—discusses the six subsystems of a structured cabling system.
- ANSI/TIA/EIA-569-A—discusses design considerations.
- ANSI/TIA/EIA-606—discusses cabling system administration.
- ANSI/TIA/EIA-607—discusses commercial building grounding and bonding requirements.

You can access these standards at **http://www.ansi.org/** or **http://www.tiaonline.org/**.

Planning for Optical Budgets

This section provides information about the optical and system budgets for GBICs and mini-GBICs.

Optical Budgets for Mini-GBICs

The total optical system budget for the SX mini-GBIC is 11.5 dB. Extreme Networks recommends that 3 dB of the total budget be reserved for losses induced by cable splices/connectors and operating margin. While 8.5 dB remains available for cable induced attenuation, the 1000BASE-SX standard specifies supported distances of 275 meters over 62.5 micron multimode fiber and 550 meters over 50 micron multimode fiber. There is no minimum attenuation or minimum cable length restriction.

The total optical system budget for the LX mini-GBIC is 13.5 dB. Measure cable plant losses with a 1310 nm light source and verify this to be within budget. When calculating the maximum distance attainable using optical cable with a specified loss per kilometer (for example 0.25 dB/km) Extreme Networks recommends that 3 dBm of the total budget be reserved for losses induced by cable splices/connectors and operating margin. Thus, 10.5 dB remains available for cable induced attenuation. There is no minimum system budget or minimum cable length restriction because the maximum receive power is the same as the maximum transmit power. There is no minimum attenuation or minimum cable length restriction.

The ZX mini-GBIC is compatible with and interoperates with long-range GBICs. For more information about the budget requirements and minimum attenuation requirements of long range GBICs, see “Long-Range GBIC System Budgets”.

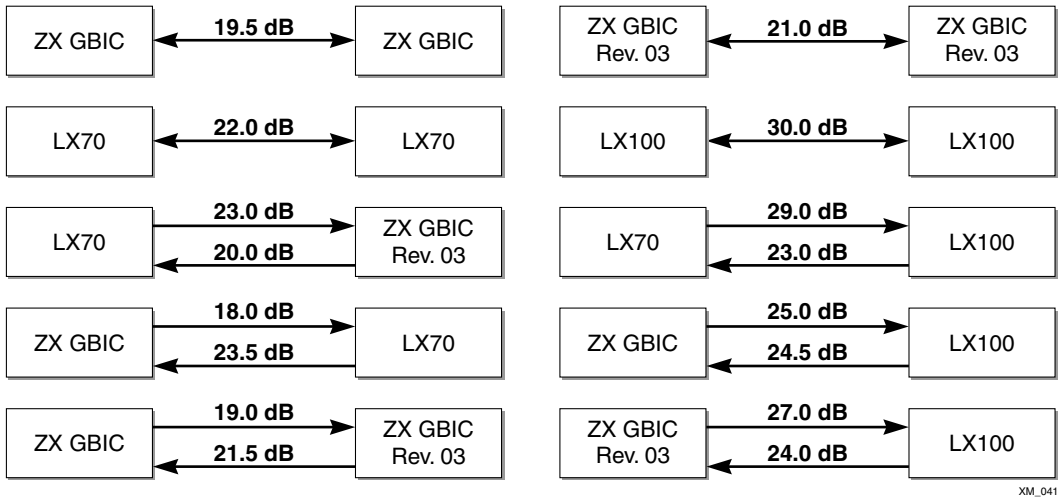
Long-Range GBIC System Budgets

Measure cable plant losses with a 1550 nm light source and verify this to be within budget. When calculating the maximum distance attainable, using optical cable with a specified loss per kilometer (for example, 0.25 db/km), Extreme Networks recommends that 3 dB of the total budget be reserved for losses induced by cable splices, connectors, and operating margin. Figure 14 shows the total optical system budget between long range GBICs.

NOTE

The fiber loss budget plus all other penalties must not exceed the total optical system budget.

Figure 14: Total optical system budgets for long range GBICs



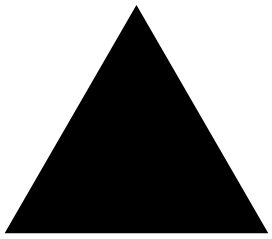
The ZX mini-GBIC is equivalent to the ZX Rev 03 GBIC.

Table 10 lists the minimum attenuations that are required by each long range GBIC to prevent saturation of the receiver.

Table 10: Minimum attenuation requirements

		Receivers			
	GBIC Type	**LX70**	**ZX (before Rev 03)**	**ZX Rev 03**	**LX100**
Transceivers	**LX70**	10 dB	10 dB	10 dB	11 dB
	ZX (before Rev 03)	0 dB	0 dB	0 dB	8 dB
	ZX Rev 03	8 dB	8 dB	8 dB	9 dB
	LX100	11 dB	11 dB	11 dB	12 dB

The ZX mini-GBIC is equivalent to the ZX Rev 03 GBIC.



Part 3
Summit Switch

3 Summit Switch Models

This chapter includes the following information about the Summit family of switches:

- Feature summary
- Physical description
- LED activity
- Port types and configurations
- Power configurations
- Optional features for the Summit switches

The Summit family of switches includes the following models:

- Summit 200 *"e"* Series on page 60
  - Summit 200-24 switch
  - Summit 200-24fx switch
  - Summit 200-24fx-TAA switch
  - Summit 200-48 switch
- Summit 300 *"e"* Series on page 65
  - Summit 300-24 switch
  - Summit 300-48 switch
- Summit 400 *"e"* Series on page 75
  - Summit 400-24t and 400-24p switches
  - Summit 400-48t switch
- Summit1i on page 88
- Summit5i on page 91
- Summit7i on page 94
- Summit48i on page 98
- Summit48si on page 100

Summit 200 "*e*" Series Switches

The Summit 200 "*e*" series switches include the following switch models:

- Summit 200-24 switch
- Summit 200-24fx switch
- Summit 200-24fx-TAA switch
- Summit 200-48 switch

NOTE

The Summit 200-24fx-TAA switch is compliant with the Trade Agreements Act (TAA).

Summit 200 "*e*" Series Switch Features

The Summit 200 switches include the Summit 200-24, Summit 200-24fx, Summit 200-24fx-TAA, and Summit 200-48 switches. These switches are compact enclosures 1U high (1.75 inches or 44.45 mm). The Summit 200 provides one of the following port configurations:

- 24 autosensing 10BASE-T/100BASE-TX ports using RJ-45 connectors
- 48 autosensing 10BASE-T/100BASE-TX ports using RJ-45 connectors
- 24 full-duplex 100BASEFX ports using LC connectors

The Summit 200 series also provides two uplink ports implemented as combination ports that pair a copper port using RJ-45 connectors with an optical port using LC connectors. The copper port operates as an autonegotiating 10/100/1000BASE-T port. The optical port allows Gigabit Ethernet uplink connections through Extreme small form factor pluggable (SFP) gigabit interface connectors (GBICs), also known as mini-GBICs. Only one port in the combination pair can be used at one time. These combination ports are described further in "Summit 200 Automatic Failover" on page 64.

Four types of mini-GBICS are available for the Summit 200 series switches: 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, or 1000BASE-BX. Mini-GBICs are purchased separately. For more information, contact your Extreme Networks Sales Representative.

In a Summit stacked configuration using the Summit 200 series switches, the uplink ports provide interconnection between the stacked switches.

Hardware Features

The Summit 200 series switch is a compact enclosure with the following features:

- One rack unit height (1.75 inches or 44.45 mm)
- 24 or 48 autosensing 10BASE-T/100BASE-TX ports using RJ-45 connectors (Summit 200-24 and 200-48 switches)
- 24 100BASEFX ports using LC connectors (Summit 200-24fx and Summit 200-24fx-TAA switches)
- Two 10/100/1000BASE-T Gigabit Ethernet uplink ports using RJ-45 connectors
- Two optical ports that allow Gigabit Ethernet uplink connections through Extreme mini-GBICs:
  - 1000BASE-SX
  - 1000BASE-LX

— 1000BASE-ZX

— 1000BASE-BX

— 1000BASE-T UTP

- Autoranging power supply that automatically adjusts to the supply voltage

Summit 200 Series Switch Physical Description

The 24-port versions of the Summit 200 series switch are the Summit 200-24 switch (Figure 15 and Figure 16) and the Summit 200-24fx and Summit 200-24fx-TAA switches (Figure 17 and Figure 18). The 48-port version is the Summit 200-48 (Figure 19 and Figure 20).

Figure 15: Summit 200-24 switch front view

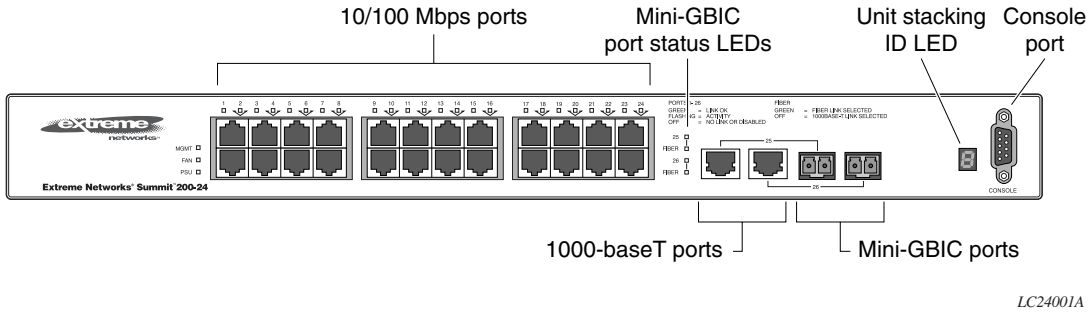


Figure 16: Summit 200-24 switch rear view

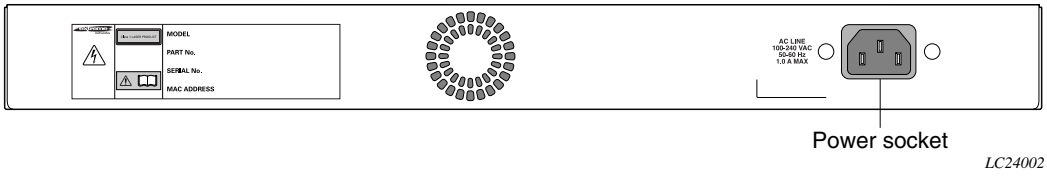


Figure 17: Summit 200-24fx and Summit 200-24fx-TAA switch front view

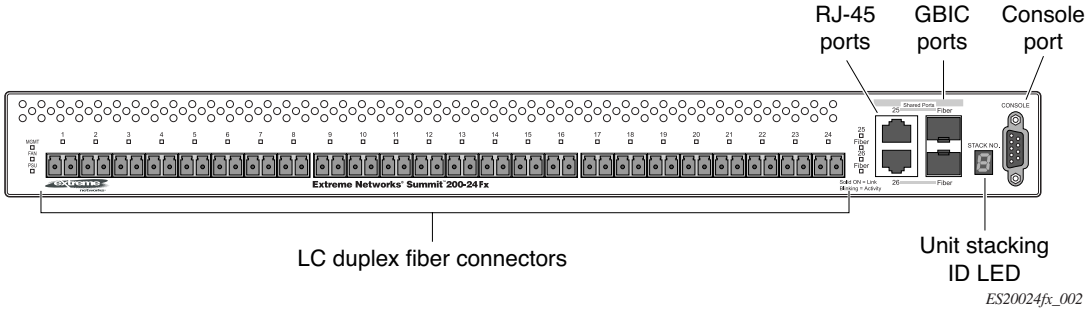


Figure 18: Summit 200-24fx and Summit 200-24fx-TAA switch rear view

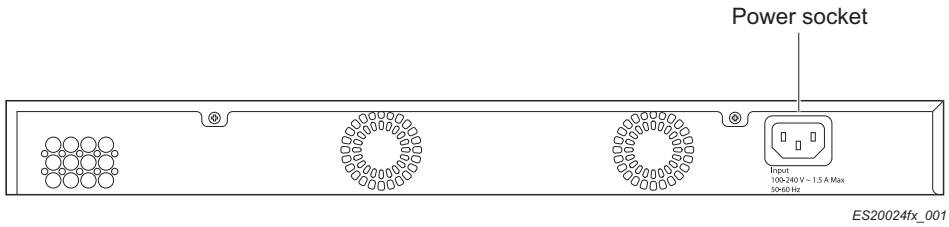


Figure 19: Summit 200-48 switch front view

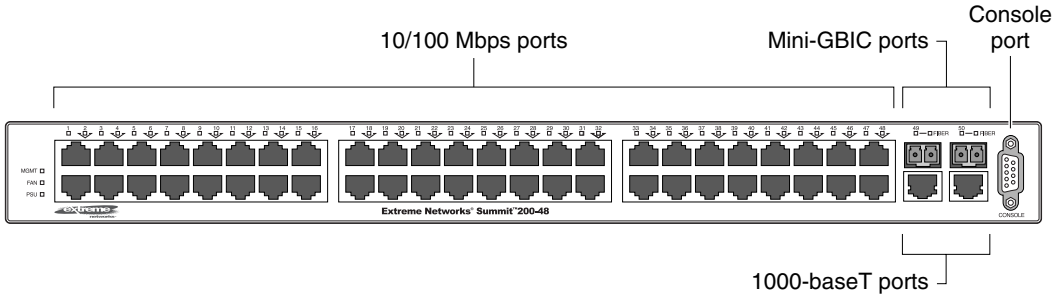
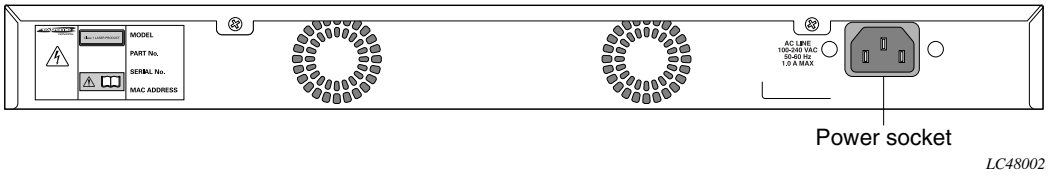


Figure 20: Summit 200-48 switch rear view



All the ports on the Summit 200 series switch have associated port activity LEDs. In addition, three LEDs indicate status for the switch, fans, and power supply. The Summit 200-24 switches also have an LED to indicate the unit ID when the switch is connected in a stacked configuration.

The rear of the Summit 200 series switch provides the AC power connection and air circulation vents. A system label that lists the serial number and the unique Ethernet MAC address assigned to this device is on the back of the Summit 200-24 and Summit 200-48 switches and on the side of the Summit 200-24fx and Summit 200-24fx-TAA switches. Use the serial number for fault reporting.

The Summit 200 switch automatically adjusts to the supply voltage. The power supply operates down to 90 V.

NOTE

The Summit 200 switch certification and safety label is located on the bottom of the switch.

Summit 200 Switch LEDs

Table 11 describes the LED activity for all three models of the Summit 200 switch.

Table 11: Summit 200 switch LED activity

Unit Status LED (MGMT LED)		
	Color	**Indicates**
	Green solid	The Summit switch power-on self test (POST) is in progress.
	Green blinking	The Summit switch is operating normally.
	Amber	The Summit switch has failed its POST or an overheat condition is detected.
	Off	There is no power.
Fan Status LED		
	Color	**Indicates**
	Green	The fan is operating normally.
	Amber blinking	The fan system has a failure.
Port Status LEDs		
	Color	**Indicates**
	Green	Link is present; port is enabled.
	Green blinking	Link is present, port is enabled, and there is activity on the port.
	Off	Link is not present or the port is disabled.
Fiber Port Status LEDs (Ports 25 and 26 or Ports 49 and 50)		
	Color	**Indicates**
	Green	Link is present; port is enabled.
	Green blinking	Link is present, port is enabled, and there is activity on the port.
	Off	Link is not present, port is disabled, non-supported GBIC is installed on the port, or the RJ-45 uplink port is in use instead of the fiber port.
Unit Stacking ID Number LED		
	Color	**Indicates**
	N/A	When several Summit “*e*” series switches are interconnected (stacked), each switch is assigned a unique stacking ID number that is visible in the unit stacking ID number LED. The switch acting as the stack master is usually assigned the number 1. However, if there is a saved configuration or if you prefer to assign a different stacking ID to the stack master, the stack master can have an ID other than 1. This LED is available only on the Summit 200-24 and 200-24fx switches.

Console Port

Use the console port (9-pin, “D” type connector) for connecting a terminal and carrying out local management.

Port Connections

A Summit 200-24 or 200-48 switch has either 24 or 48 10BASE-T/100BASE-TX ports using RJ-45 connectors for communicating with end stations and other devices over 10/100Mbps Ethernet. A Summit 200-24fx/200-24fx-TAA switch has 24 100BASE-FX ports for communicating with end stations or other devices over 100Mbps Ethernet.

The switch also has four Gigabit Ethernet uplink ports, of which only two can be used at any one time. These combination ports are labeled 25 and 26 on the front panel of the Summit 200-24 or 200-24fx and labeled 49 and 50 on the front panel of the Summit 200-48. Two of the ports are 10/100/1000BASE-T ports using RJ-45 connectors. The other two ports are unpopulated receptacles for mini-GBICs (SFPs), using optical fibers with LC connectors. All models of the Summit 200 support the use of 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, or 1000BASE-BX mini-GBICs.

The uplink ports can be used as the interconnect ports in a Summit switch stacked configuration. For more information about configuring and operating a Summit switch stack, see the *ExtremeWare Software User Guide*.

NOTE

Only mini-GBICs that have been certified by Extreme Networks (available from Extreme Networks) should be inserted into the mini-GBIC receptacles on the Summit 200 series switch.

Summit 200 Automatic Failover

The Summit 200 switch supports an automatic failover from an active fiber port to a copper backup or from an active copper port to a fiber port. If one of the uplink connections fails, the Summit 200 uplink connection automatically fails over to the second connection. On the Summit 200-24 and 200-48 switches, the preferred medium is fiber and cannot be configured. On the Summit 200-24fx and Summit 200-24fx-TAA switches, the switch determines whether the port uses the copper or fiber connection based on the order in which the connectors are inserted into the switch.

On the Summit 200-24, 200-24fx, 200-24fx-TAA switches, ports 25 and 26 are the Gigabit Ethernet ports that have the redundant PHY interfaces. On the Summit 200-48 switch, ports 49 and 50 have the redundant PHY interfaces. Each port has one mini-GBIC and one copper 1000BASE-T connection.

To set up a redundant link on one of the uplink ports, connect the active fiber and 1000BASE-T links to both the RJ-45 and mini-GBIC interfaces of that port.

Uplink Redundancy on the Summit 200-24 Switch and Summit 200-48 Switch

On the Summit 200-24 and 200-48 switches, Gigabit Ethernet uplink redundancy follows these rules:

- Only one interface on each port can be active at a time. For example, on port 25 of the Summit 200-24 switch, with both the mini-GBIC and 1000BASE-T interfaces connected, only one interface can be activated. The other is inactive. If both interfaces are connected, the switch defaults to the fiber interface (mini-GBIC) and deactivates the 1000BASE-T interface.
- If only one interface is connected, the switch activates the connected interface.
- To set up a redundant link on an uplink port, connect the active fiber and 1000BASE-T links to both the RJ-45 and mini-GBIC interfaces of the port. The switch defaults to the fiber link. If the fiber link fails during operation, the switch automatically activates the redundant 1000BASE-T link.

NOTE

When configuring the Summit 200-48 switch, all ports specified as mirrored ports and mirroring port, or ACL ingress ports and egress port, must belong to the same port group. Port group 1 consists of ports 1 through 24 and port 49; port group 2 consists of ports 25 through 48 and port 50.

Uplink Redundancy on the Summit 200-24fx and Summit 200-24fx-TAA Switch

Gigabit Ethernet uplink redundancy on the Summit 200-24fx and Summit 200-24fx-TAA switch follows these rules:

- Only one interface on each port can be active at a time. For example, on port 25, with both the mini-GBIC and 1000BASE-T interfaces connected, only one interface can be activated. The other is inactive.
- If only one interface is connected, the switch activates the connected interface.
- The switch determines whether the port uses the fiber or copper connection based on the order in which the connectors are inserted into the switch. When the switch senses that a mini-GBIC and a copper connector are inserted, the switch enables the uplink redundancy feature. For example, if you first insert mini-GBICs into ports 25 and 26, and then connect copper ports 25 and 26, the switch assigns the copper ports as redundant ports.
- To set up a redundant link on a port, connect the active fiber and 1000BASE-T links to both the RJ-45 and mini-GBIC interfaces of port 49. The switch defaults to the fiber link. If the fiber link fails during operation, the switch automatically activates the redundant 1000BASE-T link.

Hardware determines when a link is lost and swaps the primary and redundant ports to maintain stability. After a failover occurs, the switch keeps or sticks with the current port assignment until there is another failure or a user changes the assignment using the CLI. To change the uplink failover assignment, use the following command:

```
configure ports <nnn> preferred-medium {copper} | {fiber} |[force]
```

The default preferred-medium is fiber. If you use the `force` option, it disables automatic failover. If you force the preferred-medium to fiber and the fiber link goes away, the copper link is not used, even if available.

Full-Duplex Support

The Summit 200 switches provide full-duplex support for all ports. Full-duplex allows frames to be transmitted and received simultaneously and, in effect, doubles the bandwidth available on a link. All 10/100 Mbps ports on the Summit 200 switch autonegotiate for half- or full-duplex operation.

Summit 300 “e” Series Switches

The Summit 300 “e” series switches include the following switch models:

- Summit 300-24 switch
- Summit 300-48 switch

Summit 300 Features

The Summit 300 series switch supports wireless and Power over Ethernet (PoE) networks. These switches provide 24 or 48 autosensing 10BASE-T/100BASE-TX ports using RJ-45 connectors.

The Summit 300 series switches also provide either two or four uplink ports implemented as combination ports that pair a copper port using RJ-45 connectors with an optical port using LC connectors. The copper port operates as an autonegotiating 10/100/1000BASE-T port. The optical port allows Gigabit Ethernet uplink connections through Extreme small form factor pluggable (SFP) gigabit interface connectors (GBICs), also known as mini-GBICs. Only one port in the combination pair can be used at one time. These combination ports are described further in "Summit 300 Automatic Failover" on page 74.

Four types of mini-GBICS are available for the Summit 300 series switches: 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, and 1000BASE-BX. Mini-GBICs are purchased separately. For more information, contact your Extreme Networks Sales Representative.

The Summit 300 series switches support Power over Ethernet (PoE) as defined by the IEEE 802.3af specification. PoE is an effective method of supplying 48 VDC power to certain types of powered devices by way of Category 5 or Category 3 twisted pair Ethernet cables. Supported devices include the Altitude 300 wireless port, IP telephones, laptop computers, web cameras, or other devices. With PoE, a single Ethernet cable supplies power and the data connection, thereby saving time and expense associated with separate power cabling and supply.

Hardware Features

The Summit 300 switch has the following features:

- Gigabit Ethernet uplinks, fiber/UTP redundant
  - 2 uplink ports on the Summit 300-24
  - 4 uplink ports on the Summit 300-48
- 10/100 Ethernet ports
  - 24 ports on the Summit 300-24
  - 48 ports on the Summit 300-48
- Serial management port
- Autoranging power supply that automatically adjusts to the AC supply voltage
- Optional redundant power supplies
  - Rack-mountable External Power Supply 45019 (EPS-LD) for the Summit 300-24
  - Hot-swappable internal redundant power supply for the Summit 300-48
- Modular expansion slot on the Summit 300-48 that supports various port configurations

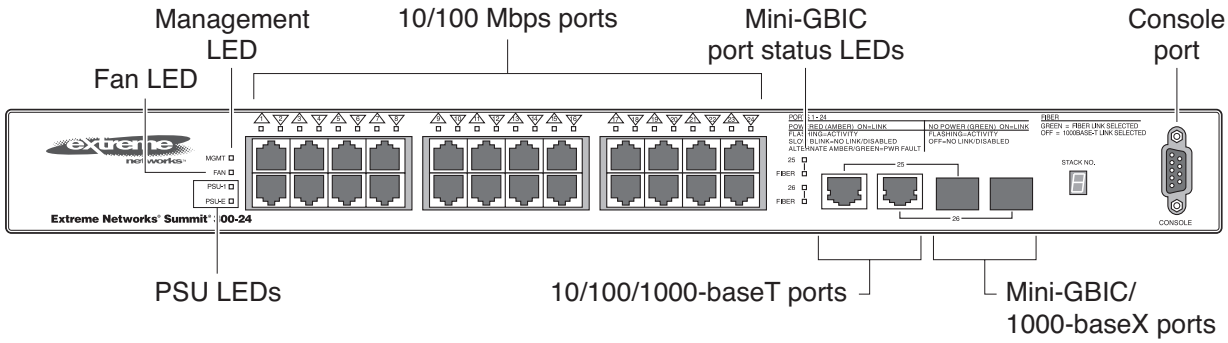
Summit 300-24 Switch

The Summit 300-24 is 1U high and provides 24 autosensing 10BASE-T/100BASE-TX ports using RJ-45 connectors. The Summit 300-24 switch also provides two combination uplink ports implemented as either 10/100/1000BASE-T ports using RJ-45 connectors or optical ports using mini-GBICs.

The Summit 300-24 switch can be interconnected with other Summit 300-24 switches or Summit 200 series switches to form a stacked configuration that is managed as a single switch entity. In a Summit stacked configuration, the uplink ports provide interconnection between the stacked switches.

Figure 21 shows the front of the Summit 300-24 switch.

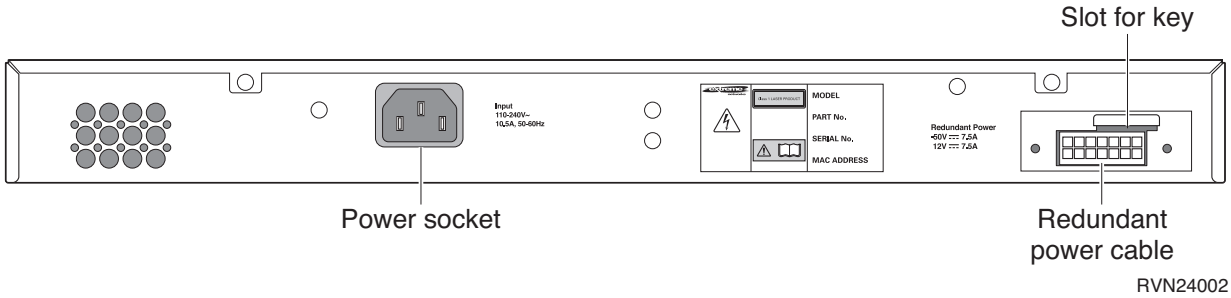
Figure 21: Summit 300-24 switch front view



The front panel of the Summit 300-24 switch includes LEDs, a console port, fixed 10/100 Mbps ports, and high-speed uplink ports implemented as either a 10/100/1000 Mbps copper port or an installed 1000-BASEx mini-GBIC.

Figure 22 shows the rear of the Summit 300-24 switch.

Figure 22: Summit 300-24 switch rear view



The rear panel of the Summit 300-24 switch provides air circulation vents, an AC power socket, a system label, and a redundant power connector. The AC power connector provides power to the switch when a power cable is connected. The system label provides the manufacturing serial number the unique Ethernet MAC address that is assigned to this device. Use the serial number for fault reporting.

The redundant power connector allows you to connect a redundant power supply to provide redundant support for the Power over Ethernet (PoE) functions of the switch. For more information about the redundant power supply, see “Redundant Power Supply” on page 70. For connector pinouts, see “Pinouts for Summit 300-24 switch redundant power connector” on page 337

Summit 300-24 Switch LEDs

The LED activity on the Summit 300-24 is described in Table 12.

Table 12: Summit 300-24 switch LED activity

Unit Status LED (MGMT LED)		
	Color	**Indicates**
	Green, solid	The Summit switch POST is in progress.
	Green, blinking	The Summit switch is operating normally.
	Amber, blinking	The Summit switch has failed its POST or an overheat condition is detected.
	Off	There is no power.
Fan LED		
	Color	**Indicates**
	Green, solid	All fans are operating normally.
	Amber, blinking	One or more fans has failed. The switch continues to operate unless over-heating occurs.
	Off	The Summit switch has no power.
Power Supply LEDs		
PSU-I	**Color**	**Indicates**
	Green, solid	The internal power supply is operating normally.
	Amber, blinking	The internal power supply has failed, or the AC connector is not plugged-in. If the power supply has failed, replace the internal power supply as soon as possible.
	Off	The internal power supply has no power.
PSU-E	**Color**	**Indicates**
	Green, solid	The external power supply is operating normally.
	Amber, blinking	The external power supply has failed, or the AC connector is not plugged-in.
	Off	The external power supply is not connected.
Port Status LEDs (Ports 1-24)		
	Color	**Indicates**
	Green, solid	Link is present and port is enabled; non-powered device.
	Green, fast blinking	Port is enabled; link is up, device non-powered and activity on the port.
	Amber, solid	Link is present and port is enabled; device powered.
	Amber, slow blinking	Link is down or port is disabled; device powered.
	Amber, fast blinking	Port is enabled; link is up, device powered and activity on the port.
	Alternating amber/green	There is a power fault.
	Off	The link is down or the port is disabled; non-powered device.

Table 12: Summit 300-24 switch LED activity (Continued)

Fiber Port Status LEDs (Ports 25—26)	
Color	**Indicates**
Green	Link is present; port is enabled.
Green blinking	Link is present, port is enabled, and there is activity on the port.
Off	Link is not present, port is disabled, or non-supported GBIC is installed on the port. The RJ-45 port is being used for the uplink.
Unit Stacking ID Number LED	
Color	**Indicates**
N/A	When several Summit “*e*” series switches are interconnected (stacked), each switch is assigned a unique stacking ID number that is visible in the unit stacking ID number LED. The switch acting as the stack master is usually assigned the number 1. However, if there is a saved configuration or if you prefer to assign a different stacking ID to the stack master, the stack master can have an ID other than 1. This LED is available only on the Summit 300-24

Console Port

Use the console port (9-pin, “D” type connector) for connecting a terminal and carrying out local management.

Port Connections

The Summit 300-24 switch uses a combination of 10BASE-T/100BASE-TX ports using RJ-45 connectors and small form factor pluggable (SFP) Gigabit interface connectors (GBICs), also known as mini-GBICs.

Ports 1 through 24 are 10/100BASE-T ports with RJ-45 connectors.

Ports 25 and 26 are Gigabit Ethernet ports that have redundant PHY interfaces for uplink redundancy. The dual-media support consists of one mini-GBIC and one 1000BASE-T connection for each port. Only one media type (fiber or copper) can be active at the same time.

The switch determines whether the port is the primary or redundant port based upon the order in which the cables are inserted into the switch. When the switch senses that cables are in both the fiber and corresponding copper port, the switch enables the uplink redundancy feature. For further information, see “Summit 300 Automatic Failover” on page 74.

Ports 25 and 26 can be used as the interconnect ports in a Summit switch stacked configuration. For more information about configuring and operating a Summit switch stack, see the *ExtremeWare User Guide*.

Full-Duplex. The Summit 300-24 switch provides full-duplex support for all ports. Full-duplex allows frames to be transmitted and received simultaneously and, in effect, doubles the bandwidth available on a link. All 10/100 Mbps ports on the Summit 300-24 switch autonegotiate for half- or full-duplex operation.

Redundant Power Supply

Summit 300-24 switch software is responsible for managing overall power consumption to ensure that it does not attempt to deliver more power than is available. The Summit 300-24 has sufficient power budget to provide full 15.4 watts power on all 24 ports simultaneously.

The Extreme Networks External Power Supply 45019 (EPS-LD) is an optional external power supply that provides redundant power for the Summit 300-24 switch. For instructions to install and connect the EPS-LD, see "Installing or Removing an External Power Supply 45019 (EPS-LD)" on page 118.

To determine the wattage of installed power supplies when the power supplies are in 1-to-1 redundant mode, use the `show inline-power` command. When the power supplies are in PoE mode, most of the power is dissipated externally to the switch by way of the inside attached powered devices.

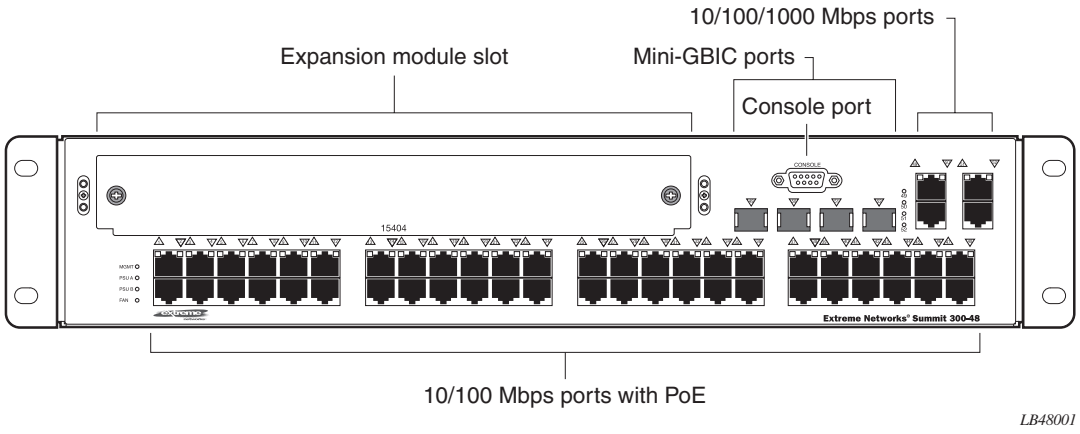
Summit 300-48 Switch

The Summit 300-48 is 2U high and provides 48 autosensing10BASE-T/100BASE-TX ports using RJ-45 connectors. The Summit 300-48 also provides four combination uplink ports implemented as either 10/100/1000BASE-T ports using RJ-45 connectors or optical ports using mini-GBICs. The optical ports are also combination uplink ports. For further information, see "Summit 300 Automatic Failover" on page 74.

The Summit 300-48 requires a minimum software level of ExtremeWare 6.2a.1.2.

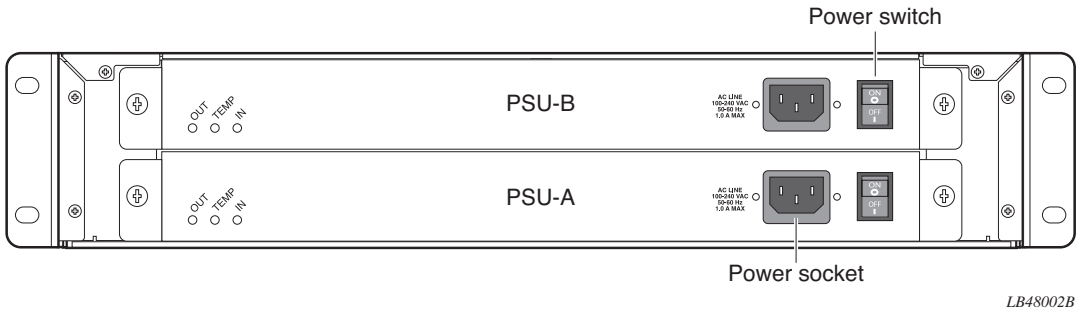
The Summit 300-48 is shown in Figure 23 and Figure 24.

Figure 23: Summit 300-48 switch front view



The front panel of the Summit 300-48 switch includes LEDs, fixed 10BASE-T/100BASE-TX ports, unpopulated ports for installing mini-GBICs, and a console port.

Figure 24: Summit 300-48 switch rear view



The rear panel of the Summit 300-48 switch provides the AC power connector and power switch for each installed power supply. Do not turn on power to the switch until instructed in the installation procedures. The Summit 300-48 switch automatically adjusts to the supply voltage. The power supply operates down to 90 V.

LEDs on the rear panel indicate voltage out and voltage in conditions, as well as over-temperature conditions.

NOTE

The Summit 300-48 switch certification and safety label, and the serial number and MAC address labels are located on the bottom of the switch.

Summit 300-48 Switch LEDs

The LED activity for the Summit 300-48 is shown in Table 13.

Table 13: Summit 300-48 switch LED activity

Unit Status LED (MGMT LED)	
Color	**Indicates**
Solid Green	The Summit switch POST is in progress
Blinking Green	The Summit switch is operating normally.
Solid Amber	The Summit has failed its POST.
Off	No power.
Power Supply Status LEDs (per power supply)	
Color	**Indicates**
Solid Green	The power supply is operating normally.
Solid Amber	There is a fault.
Off	There is no power.
Fan Unit Status LEDs	
Color	**Indicates**
Solid Green	The fan is operating normally.
Solid Amber	There is a fault.
Off	There is no power.

Table 13: Summit 300-48 switch LED activity (Continued)

Power Supply Status LEDs		
LED	**Color**	**Indicates**
OUT	Solid Green	The output voltages are enabled and within specification.
	Off	There is a fault on at least one output voltage or voltages are out of specification.
TEMP	Solid Amber	The fan failed or there is an over temperature condition.
	Off	The fan is operating normally and operating temperature is within limit.
IN	Solid Green	The input voltage is within specification and the input section is working.
	Off	The input voltage is out of range or there is a fault in the input section.
10/100 Mbps Port Status LEDs		
Color		**Indicates**
Green, solid		Link is present and port is enabled; non-powered device.
Green, fast blinking		Port is enabled; link is up, device non-powered and activity on the port.
Amber, solid		Link is present and port is enabled; device powered.
Amber, slow blinking		Link is down or port is disabled; device powered.
Amber, fast blinking		Port is enabled; link is up, device powered and activity on the port.
Alternating amber/green		There is a power fault.
Off		The link is down or the port is disabled; non-powered device.
10/100/1000 Mbps Port Status LEDs		
Color		**Indicates**
Green solid		Link is present; port is enabled; full-duplex operation.
Green blinking		Link is present; there is activity.
Amber blinking		Reserved.
Off		Link is not present or the port is disabled.
Fiber Port Status LEDs		
Color		**Indicates**
Solid Green		Link is present; port is enabled; full-duplex operation.
Blinking Green		Link is present; there is activity.
Off		Link is not present; port is disabled; mini-GBIC is not installed.

Console Port

Use the console port (9-pin, “D” type connector) for connecting a terminal and carrying out local management.

Port Connections

The Summit 300-48 switch uses a combination of 10BASE-T/100BASE-TX ports using RJ-45 connectors and small form factor pluggable (SFP) Gigabit interface connectors (GBICs), also known as mini-GBICs.

Ports 1 through 48 are 10/100 ports with RJ45 connectors.

Full-Duplex. The Summit 300-48 switch provides full-duplex support for all ports. Full-duplex allows frames to be transmitted and received simultaneously and, in effect, doubles the bandwidth available on a link. All 10/100 Mbps ports on the Summit 300-48 switch autonegotiate for half- or full-duplex operation.

Load Sharing Power Supplies

The PoE subsystem in the Summit 300-48 supports dual power supplies for either redundant or load-sharing modes. Redundant mode is the default and provides hitless PoE should one of the two power supplies fail, be removed, or powered off. Load-sharing mode allows both power supplies to provide power to the PoE system, providing greater PoE power capacity. For load-sharing operation, the amount of power provided to the PoE system is the sum of the power supplied by the power supplies.

NOTE

With load-sharing, all PoE devices may experience a power hit if a power supply fails.

The Summit 300-48 switch is shipped with either one or two installed 600 W AC internal power supply units (PSUs). For technical specifications of the power supplies, see “Summit 300-48 internal power supply electrical specifications” on page 323.

To determine the wattage of the installed PSUs when the PSUs are in redundant mode, use the `show inline-power` command. If `System maximum internal inline-power` field indicates 480 W, that means that 600 W PSUs are installed.

Power Supply LEDs

The Summit 300-48 power supply has three LEDs that are visible from the rear of the Summit 300-48 when the supply is installed, as shown in Figure 25. The IN LED indicates the condition of the input power (AC power source). When the input power is satisfactory, the IN LED is green, otherwise it is off. The TEMP LED indicates the condition of the cooling fan or operating temperature. When the operating temperature and fan cooling is satisfactory the TEMP LED is off, otherwise it is amber. The OUT LED indicates the condition of the output DC power supplied by the power supply to the switch. When the output power is satisfactory the OUT LED is green, otherwise it is off.

Figure 25: Power supply LEDs

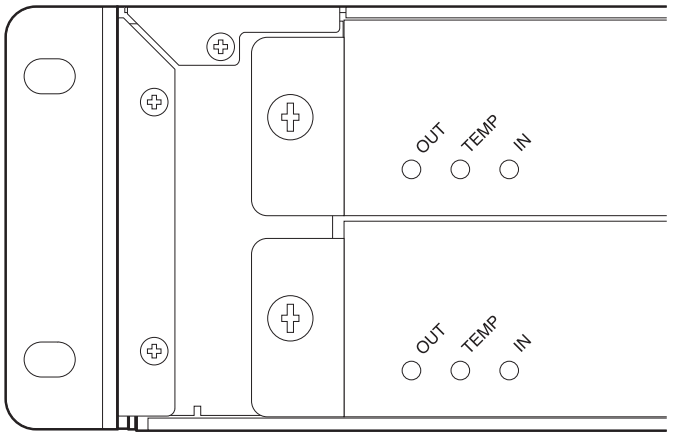


Table 14: Summit 300-48 power supply LED activity

Condition	IN LED Indication	TEMP LED Indication	OUT LED Indication
Normal	Green	Off	Green
Supply Inhibited or overloaded	Green	Off	Off
Input AC Low or Missing	Off	Off	Off
Fan Failure or Over Temperature	Green	Amber	Off

Summit 300 Automatic Failover

The Summit 300 switches provide dual-media support on Gigabit Ethernet ports. On the Summit 300-24, ports 24 and 25 are Gigabit Ethernet ports that have redundant PHY interfaces, one mini-GBIC and one 1000BASE-T connection for each port. On the Summit 300-48, ports 1:49 through 1:52 are dual-mode redundant ports. Only one media type (fiber or copper) can be active at the same time on those ports.

The two fiber ports and the last two of the 10/100/1000BASE-T ports on the Summit 300-24 and the four fiber ports and the last four of the 10/100/1000BASE-T ports on the Summit 300-48 are designed as combination ports for uplink redundancy. When sharing ports, only the fiber medium or only the copper medium can be active at the same time. If copper medium 1 goes down while transmitting packets, fiber medium 1X activates and becomes the primary link.

The switch determines whether the port uses the primary or redundant media based on the order in which the connectors are inserted into the switch. When the switch senses that a mini-GBIC and a copper connector are inserted, the switch enables the uplink redundancy feature. For example, if you first insert mini-GBICs into ports 1:49 and 1:51 on the Summit 300-48, and then connect copper ports 1:1 and 1:3, the switch assigns ports 1:1 and 1:3 as redundant ports. On the Summit 300-24, if you insert a mini-GBIC into port 24 and then an Ethernet cable connector into port 1, fiber becomes the primary uplink port and port 1 becomes the redundant port.

Hardware determines when a link is lost and swaps the primary and redundant ports to maintain stability. After a failover occurs, the switch keeps or sticks with the current port assignment until there

is another failure or a user changes the assignment using the CLI. To change the uplink failover assignment, use the following command:

```
configure ports <nnn> preferred-medium {copper} | {fiber} |[force]
```

The default preferred-medium is fiber. If you use the `force` option, it disables automatic failover. If you force the preferred-medium to fiber and the fiber link goes away, the copper link is not used, even if available.

Summit 400 “*e*” Series Switches

The Summit 400 “e” series switches include the following switch models:

- Summit 400-24t switch
- Summit 400-24p switch
- Summit 400-48t switch

Summit 400-24 Switches

The Summit 400-24t or 400-24p switch is a compact enclosure (see Figure 26) one rack unit high (1.73 inches or 44.0 mm) that provides 24 autosensing 10/100/1000BASE-T ports using RJ-45 connectors. On the Summit 400-24p switch, these ports support Power over Ethernet operation as defined by the IEEE 802.3af specification. The Summit 400-24 switch also has four fiber ports that allow Gigabit Ethernet uplink connections through Extreme 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, or 1000BASE-BX SFP mini-GBICs using LC connectors. The four fiber ports and the last four of the 10/100/1000BASE-T ports are designed as shared, or *combination*, ports for uplink redundancy. When sharing ports, only the fiber port or only the copper port can be active at the same time. For more information about cabling and configuring this feature, see “Uplink Redundancy” on page 80.

The back panel of the Summit 400-24 switch provides two high-performance dedicated stacking connectors for interconnecting Summit 400-series switches in a stacked configuration.

Hardware Features

The Summit 400-24 switch has the following hardware features:

- 24 10/100/1000BASE-T ports
- 4 fiber SFP (mini-GBIC 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, and 1000BASE-BX)

  The fiber ports share PHY with the last four copper ports.
- 1 console port, serial
- 2 dedicated stacking ports (10 Gigabit)
- Support for redundant power support using the optional EPS 160 External Power Supply (Summit 400-24t) or the EPS-LD External Power Supply (Summit 400-24p)
- Redundant uplink support

Summit 400-24 Physical Description

Figure 26 shows the front of the Summit 400-24t switch. Figure 27 shows the front of the Summit 400-24p switch.

Figure 26: Summit 400-24t switch front view

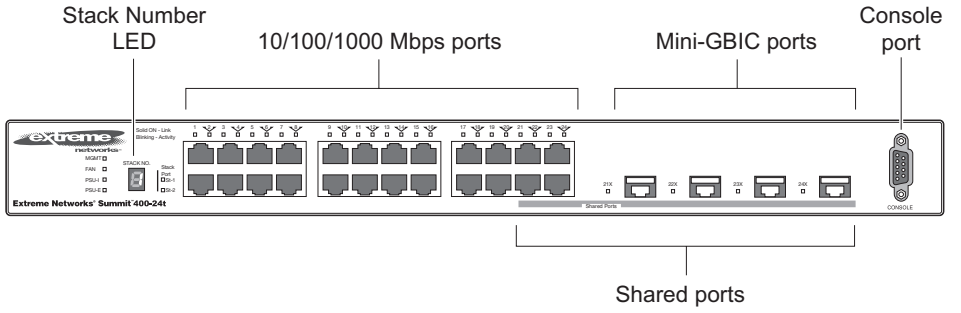
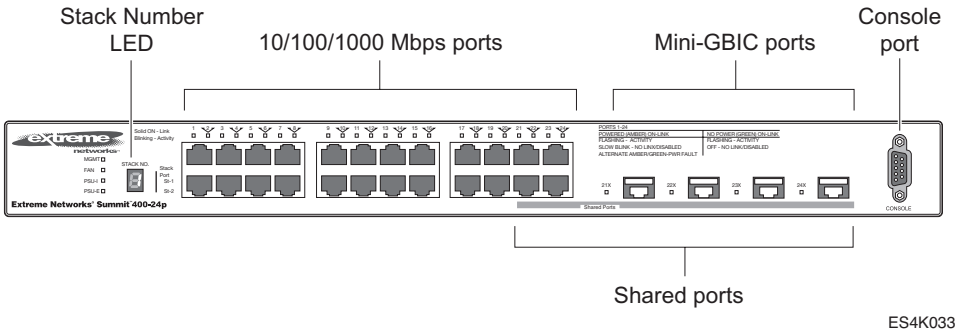


Figure 27: Summit 400-24p switch front view



The front panel includes LEDs, fixed 10/100/1000BASE-T ports, unpopulated ports for installing mini-GBICs, and a console port.

Figure 28 shows the rear view of the Summit 400-24t switch. Figure 29 shows the rear view of the Summit 400-24p switch.

Figure 28: Summit 400-24t switch rear view

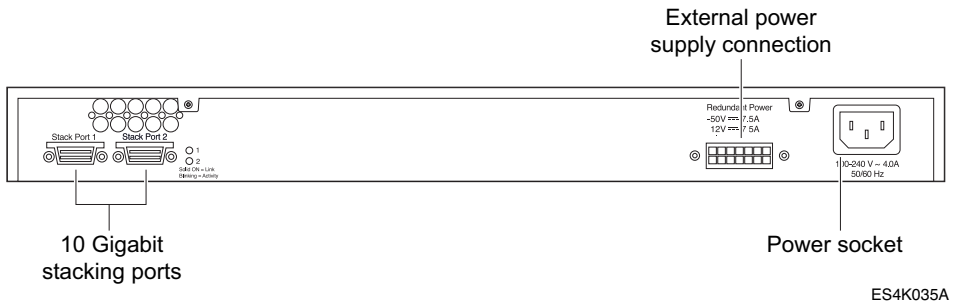
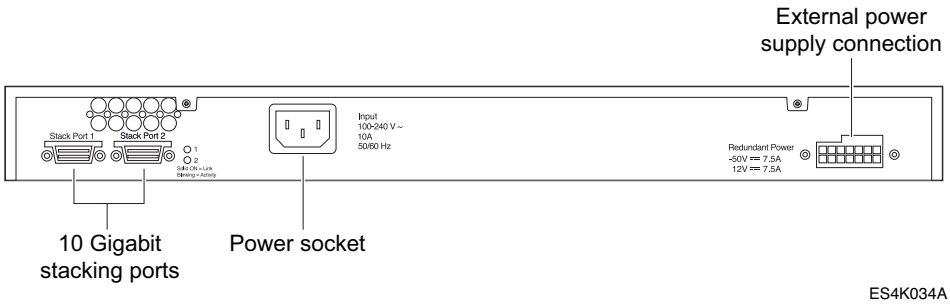


Figure 29: Summit 400-24p switch rear view



The rear panel includes:

- Two high-performance stacking ports.

  These ports are used to interconnect the switches in a Summit switch stacked configuration. They require a stacking cable that is available from Extreme Networks.
- Vents for the internal power supply fan.
- Connector for an optional external power supply.
- AC power socket.

  The Summit 400-24 switch automatically adjusts to the supply voltage. The power supply operates from 100 VAC to 240 VAC.

NOTE

The Summit 400-24 switch certification, safety label, and serial number are located on the bottom of the switch.

Summit 400-24 Switch LEDs

The front panel has five types of LEDs:

- Management

  The MGMT LED indicates the status of the switch.
- Fan

  The FAN LED indicates the status of the cooling fans.
- Power

  The Summit 400-24 switch comes with an internal power supply and can be connected to the Extreme External Power Supply tray. The status of the internal power supply is indicated by the PSU-I LED. The status of the external power supply is indicated by the PSU-E LED.
- 10/100/1000BASE-T port status

  Each of the 24 copper 10/100/1000BASE-T ports on the Summit 400-24t switch has an associated LED located above the port.
- Fiber port status

  Each of the four optical fiber ports has an associated LED located to the left of the port.

Each stacking port on the back of the switch also has an associated LED.

Table 15 describes the activity of the LEDs on the Summit 400-24 switch.

Table 15: Summit 400-24 switch LED activity

Unit Status LED (MGMT LED)		
	Color	**Indicates**
	Green, slow blinking	The Summit switch is operating normally.
	Green, fast blinking	The Summit switch POST is in progress.
	Green, solid	POST passed; ExtremeWare is booting.
	Amber, blinking	The Summit switch has failed its POST or an overheat condition is detected.
	Off	The Summit switch has no power.
Fan Status LED		
	Color	**Indicates**
	Green solid	All fans are operating normally.
	Amber blinking	One or more fans has failed. The switch continues to operate unless over-heating occurs.
	Off	The Summit switch has no power.
Power Supply LEDs		
PSU-I	**Color**	**Indicates**
	Green, solid	The internal power supply is operating normally.
	Amber, blinking	The internal power supply has failed. Replace the internal power supply as soon as possible.
	Off	The internal power supply has no power.
PSU-E	**Color**	**Indicates**
	Green, solid	The external power supply is operating normally.
	Off	The external power supply is not connected.
Port Status LEDs (Ports 1–24)—Summit 400-24t switch		
	Color	**Indicates**
	Green, solid	The link is present; port is enabled.
	Green, blinking	The link is present and the port is transmitting or receiving packets.
	Off	The link is not present.

Table 15: Summit 400-24 switch LED activity

Port Status LEDs (Ports 1–24)—Summit 400-24p switch	
Color	**Indicates**
Green, solid	Link is present and port is enabled; non-powered device.
Green, fast blinking	Port is enabled; link is up, device non-powered and activity on the port.
Amber, solid	Link is present and port is enabled; device powered.
Amber, slow blinking	Link is down or port is disabled; device powered.
Amber, fast blinking	Port is enabled; link is up, device powered and activity on the port.
Alternating amber/green	There is a power fault.
Off	The link is down or the port is disabled; non-powered device.
Fiber LEDs (Ports 21X–24X)	
Color	**Indicates**
Green, solid	Fiber link is selected; mini-GBIC is present and being used for the Gigabit Ethernet uplink.
Green, blinking	The link is present and the port is transmitting or receiving packets.
Off	1000BASE-T link is selected; the switch is using the RJ-45 port for the Gigabit Ethernet uplink.
Stack Number LED	
Color	**Indicates**
N/A	When several Summit "*e*" series switches are interconnected (stacked), each switch is assigned a unique stacking ID number that is visible in the unit stacking ID number LED. The switch acting as the stack master is usually assigned the number 1. However, if there is a saved configuration or if you prefer to assign a different stacking ID to the stack master, the stack master can have an ID other than 1. This LED is available only on the Summit 400-24.
Stacking Port Status LED	
Color	**Indicates**
Green, solid	The link is present; port is enabled.
Green, blinking	The link is present and the port is transmitting or receiving packets.
Off	The link is not present.

Port Connections

The Summit 400-24 switch has 24 copper 10/100/1000BASE-T ports using RJ-45 connectors for communicating with end stations and other devices over 10/100/1000 Mbps Ethernet.

The switch also has four fiber ports that allow Gigabit Ethernet uplink connections through Extreme 1000BASE-SX, 1000BASE-LX, 1000BASE-SX, or 1000BASE-BX SFP mini-GBICs using LC connectors.

Two stacking connectors on the back of the switch allow interconnection of the switch in a Summit switch stacked configuration. For information about using these ports, see "Installing a Summit Stacked Configuration" on page 112. For information about configuring and operating a Summit switch stack, see the *ExtremeWare Software User Guide*.

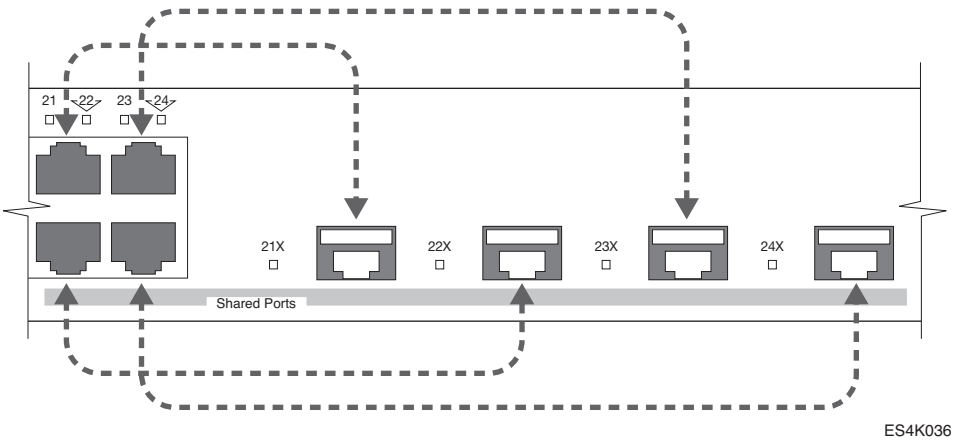
The switch provides full-duplex support for all ports. Full-duplex allows frames to be transmitted and received simultaneously and, in effect, doubles the bandwidth available on a link. All 10/100/1000 Mbps ports on the Summit 400-24 switch autonegotiate for half- or full-duplex operation.

Uplink Redundancy

The four fiber ports and the last four of the 10/100/1000BASE-T ports are designed as combination ports for uplink redundancy. When a pair of ports is shared, only the fiber port or only the copper port can be active at the same time. For example, if copper port 21 goes down while transmitting packets, fiber port 21X activates and becomes the primary link. See Figure 30 for a diagram of these combination ports.

The switch determines whether the port is the primary or redundant port based on the order in which the cables are inserted into the switch. When the switch senses that cables are in both the fiber and corresponding copper port, the switch enables the uplink redundancy feature. For example, if you insert mini-GBICs into ports 21X and 23X first, and then connect copper ports 21 and 23, the switch assigns ports 21 and 23 as redundant ports.

Figure 30: Shared ports on the Summit 400-24 switch



You can override the configuration and behavior of these ports through the CLI. Using the CLI, you can set a preference for either fiber or copper. You can also turn off port redundancy using the *force* option. If a combination port fails to link, determine whether the *force* option is in effect. For more information about using the CLI to set redundancy priority, see the *ExtremeWare Software Users Guide*.

The Summit 400-24 switch Gigabit Ethernet port failover from the fiber link to the copper link takes 4 to 5 seconds. The Summit 400-24 switch Gigabit Ethernet port failover from the copper link to the fiber link takes 2 to 3 seconds.

Summit 400-48t switch

The Summit 400-48t switch is a compact enclosure (see Figure 31) one rack unit in height (1.73 inches or 44.0 mm) that provides 48 autosensing 10/100/1000BASE-T ports using RJ-45 connectors. The switch also has four fiber ports that allow Gigabit Ethernet uplink connections through Extreme 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, or 1000BASE-BX SFP mini-GBICs using LC connectors. The four fiber ports and the first four of the 10/100/1000BASE-T ports are designed as shared, or *combination ports* for uplink redundancy. When sharing ports, only the fiber port or only the copper port can be active at the

same time. For more information about cabling and configuring this feature, see “Uplink Redundancy” on page 85.

The back panel of the Summit 400-48t switch provides an option slot for two modular 10-gigabit uplink ports. In addition, two high-performance dedicated stacking connectors allow you to interconnect Summit 400-series switches in a stacked configuration.

Hardware Features

The Summit 400-48t switch has the following hardware features:

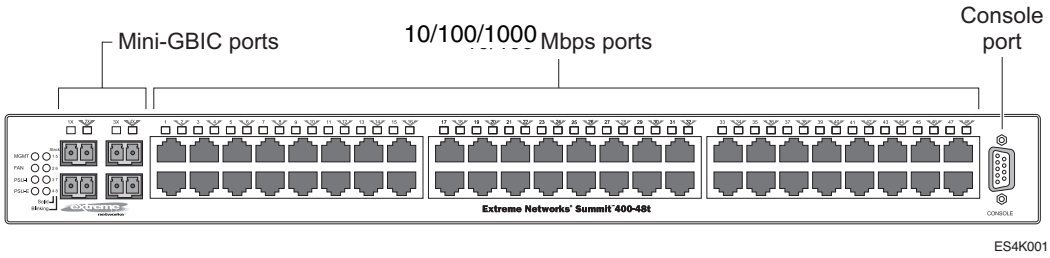
- 48 copper ports (10/100/1000BASE-T)
- 4 fiber SFP ports (mini-GBIC 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, and 1000BASE-BX)

  The fiber ports share PHY with the first four copper ports.
- 1 copper management port 10/100/1000BASE-T
- 1 console port, serial
- 2 (optional) modular 10 Gigabit uplink ports
- 2 dedicated stacking ports (10 Gigabit)
- Support for redundant power support using the optional EPS 160 External Power Supply
- Redundant uplink support

Summit 400-48t Physical Description

Figure 31 shows the front of the Summit 400-48t switch.

Figure 31: Summit 400-48t switch front view

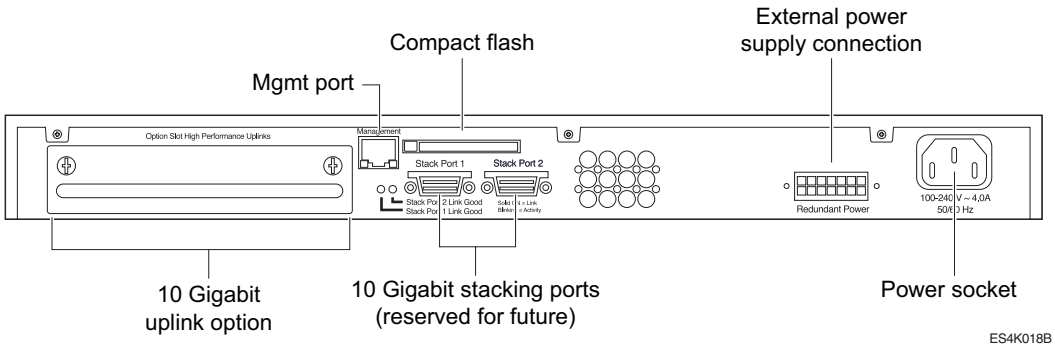


The front panel includes:

- LEDs to indicate switch and port operating status (see “Summit 400-48t Switch LEDs” on page 82).
- 10/100/1000BASE-T ports (see “Port Connections” on page 84).
- Console Port—Use the console port (9-pin, “D” type connector) to attach a terminal and access the CLI through a serial connection. Use the console port to carry out local management.

Figure 32 shows the rear panel of the Summit 400-48t switch.

Figure 32: Summit 400-48t switch rear view



The rear panel includes:

- An option slot for the dual 10 Gigabit uplinks
- The management port (see "Management Port" on page 84)
- A compact flash slot

  This slot is currently not supported but is reserved for future use.
- Two high-performance dedicated stacking ports

  These ports are used to interconnect the switches in a Summit switch stacked configuration. They require the UniStack Stacking Cable, available from Extreme Networks.
- Vents for the internal power supply fan.
- The connector for the optional Extreme External Power Supply System.
- AC Power Socket

  The Summit 400-48t switch automatically adjusts to the supply voltage. The power supply operates from 100 VAC to 240 VAC.

NOTE

The Summit 400-48t switch certification, safety label, and serial number are located on the bottom of the switch.

Summit 400-48t Switch LEDs

The front panel has six types of LEDs:

- Management

  The MGMT LED indicates the status of the switch.
- Fan

  The FAN LED indicates the status of the cooling fans.
- Power

  The Summit 400-48t comes with an internal power supply and can be connected to the Extreme External Power Supply tray. The status of the internal power supply is indicated by the PSU-I LED. The status of the external power supply is indicated by the PSU-E LED.

- Stack

  A column of four LEDs (Figure 33) indicates the unit number of the switch in a stack.
- 10/100/1000BASE-T port status

  Each of the 48 copper 10/100/1000BASE-T ports has an associated LED located above the port.
- Fiber port status

  Each of the four optical fiber ports has an associated LED located above the port.

Figure 33: Stack LEDs on the Summit 400-48t switch

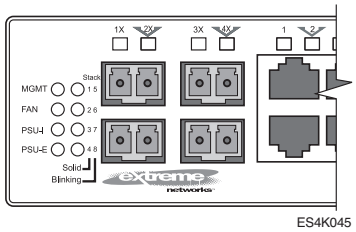


Table 16 describes the activity of the front-panel LEDs on the Summit 400-48t switch.

Table 16: Summit 400-48t switch LED activity

Unit Status LED (MGMT LED)		
	Color	**Indicates**
	Green, slow blinking	The switch is operating normally.
	Green, fast blinking	The power-on self-test (POST) is in progress.
	Green, solid	POST passed; ExtremeWare is booting.
	Amber, blinking	The switch has failed its POST or an overheat condition is detected.
	Off	The switch has no power.
Fan Status LED		
	Color	**Indicates**
	Green solid	All fans are operating normally.
	Amber blinking	One or more fans has failed. The switch continues to operate unless over-heating occurs.
	Off	The switch has no power.
Power Supply LEDs		
PSU-I	**Color**	**Indicates**
	Green, solid	The internal power supply is operating normally.
	Amber, blinking	The internal power supply has failed. Replace the internal power supply as soon as possible.
	Off	The internal power supply has no power.
PSU-E	**Color**	**Indicates**
	Green, solid	The external power supply is operating normally.
	Off	The external power supply is not connected.

Table 16: Summit 400-48t switch LED activity

Stack LEDs

Two columns of numbers next to the LEDs represent the stack unit number. The state of the LED, either solid or blinking, indicates either the left column or the right column.

Color	Indicates
Green, solid	Top LED—This switch is the master unit in the stack (number 1).
	Any other LED—This switch is stack member 2, 3, or 4, indicated by the number next to the LED.
Green, blinking	Any LED—This switch is stack member 5, 6,7, or 8, indicated by the number next to the LED.
All LEDs Off	Stacking is not enabled.

Port Status LEDs (Ports 1–48)

Color	Indicates
Green, solid	The link is present; port is enabled.
Green, blinking	The link is present and the port is transmitting or receiving packets.
Off	The link is not present.

Fiber LEDs (Ports 1X—4X)

Color	Indicates
Green, solid	Fiber link is selected; mini-GBIC is present and being used for the Gigabit Ethernet uplink.
Green, blinking	The link is present and the port is transmitting or receiving packets.
Off	1000BASE-T link is selected; the switch is using the RJ-45 port for the Gigabit Ethernet uplink.

Port Connections

The Summit 400-48t switch has 48 copper 10/100/1000BASE-T ports using RJ-45 connectors for communicating with end stations and other devices over 10/100/1000 Mbps Ethernet.

The switch also has four fiber ports that allow Gigabit Ethernet uplink connections through Extreme 1000BASE-SX, 1000BASE-LX, 1000BASE-SX, or 1000BSE-BX SFP mini-GBICs using LC connectors.

Two dedicated high-performance stacking connectors on the back of the switch allow interconnection of Summit 400 series switches in a Summit stacked configuration. For information about using these ports, see “Installing a Summit Stacked Configuration” on page 112. For more information about configuring and operating a Summit stacked configuration, see the *ExtremeWare Software User Guide*.

The switch provides full-duplex support for all ports. Full-duplex allows frames to be transmitted and received simultaneously and, in effect, doubles the bandwidth available on a link. All 10/100/1000 Mbps ports on the switch autonegotiate for half- or full-duplex operation.

Management Port

The 10/100/1000BASE-T Ethernet management port communicates directly with the CPU of the switch, bypassing the switch. Connect an Ethernet cable directly from a laptop into the management port to view and locally manage the switch configurations.

Do not assign an in-band IP address to the management port VLAN. The management port VLAN is an out-of-band VLAN, so if it is assigned an in-band IP address (an address where the source and destination are in the same subnet), the switch treats it as a normal VLAN and attempts to route traffic through it.

Extreme Networks does not recommend that you use the management port to route traffic to any front panel port on the switch. The management port is designed only for switch management purposes.

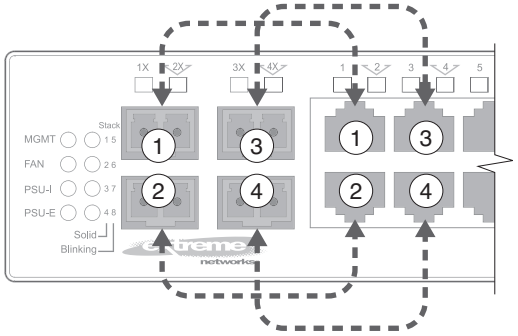
There are two LEDs for the management port, located in the bottom corners of the port. The LED on the bottom right turns solid green when a cable is inserted and the port detects a link. The LED on the bottom left blinks green when there is transmission activity on the link.

Uplink Redundancy

The four fiber ports and the first four of the 10/100/1000BASE-T ports are designed as combination ports for uplink redundancy. When sharing ports, only the fiber port or only the copper port can be active at the same time. If copper port 1 goes down while transmitting packets, fiber port 1X activates and becomes the primary link. See Figure 34 for a diagram of these combination ports.

The switch determines whether the port is the primary or redundant port based upon the order in which the cables are inserted into the switch. When the switch senses that cables are in both the fiber and corresponding copper port, the switch enables the uplink redundancy feature. For example, if you insert mini-GBICs into ports 1X and 3X first, and then connect copper ports 1 and 3, the switch assigns ports 1 and 3 as redundant ports.

Figure 34: Redundancy cabling



You can override the configuration and behavior of these ports through the CLI. Using the CLI, you can set a preference for either fiber or copper. You can also turn off port redundancy using the *force* option. If a combination port fails to link, determine whether the *force* option is in effect. For more information about using the CLI to set redundancy priority, see the *ExtremeWare Software Users Guide*.

The Summit 400-48t switch Gigabit Ethernet port failover from the fiber link to the copper link takes 4-5 seconds. The Gigabit Ethernet port failover from the copper link to the fiber link takes 2-3 seconds.

NOTE

To support automatic failover between the fiber and copper ports, you must use an Extreme mini-GBIC connector.

Summit 400 "*e*" Series Optional Features

Extreme Networks offers optional hardware products that extend the capabilities of the Summit 400 switch. These products are additional offerings and are available from your sales representative.

Before installing any hardware option, be sure to check the Installation Notes provided with the device to determine the latest installation process or limitations.

Summit Option Card

For the Summit 400-48t switch, the Summit XEN Card or XGM-2xn Option Card is an additional card that adds one or two 10 Gigabit uplink modules to the back of the switch. The uplink modules are optical transceivers that are available in short-range, long-range, and extended-range versions. For instructions to install the option card and uplink modules, see Appendix E.

External Power System—Summit 400-24t and Summit 400-48t

The Extreme External Power System (EPS) allows you to add a redundant power supply to the Summit 400-48t or Summit 400-24t switch to provide power redundancy and protect against a power supply failure. The EPS consists of an EPS-T rack-mountable tray and one or two installed EPS-160 power supplies. Each EPS-160 power supply provides one-to-one redundancy to an attached Summit 400-48t or Summit 400-24t switch.

The EPS can be ordered with one or two EPS-160 power supplies. You can order an additional EPS-160 to add to an EPS system with only one power supply. Each EPS-160 unit ships with a special redundant power supply cable. Refer to the Extreme Networks website or talk to your local sales representative for a list of compatible Extreme Networks switches. For instructions to install the external power system, see "Installing an External Power System for a Summit 400 Switch" on page 124.

For specifications for the EPS-160 power supply, see "EPS-160 AC Power Supply Specifications" on page 325. For wire-to-pin connections on the connector on the rear panel of the EPS-160, see "Power Connector Specifications" on page 337. Power supply specifications and compliance information are also available from the Extreme website.

EPS-LD—Summit 400-24p

The Extreme Networks External Power Supply 45019 (EPS-LD) is an optional external power supply that provides redundant power for the Summit 400-24p switch. For instructions to install and connect the EPS-LD, see "Installing or Removing an External Power Supply 45019 (EPS-LD)" on page 118.

Summit "*i*" Series Switches

The Summit "*i*" series switches include the following models:

- Summit1i
- Summit5i
- Summit7i
- Summit48i
- Summit48si

Memory Requirements

The "*i*" series Summit switch must have 128MB of DRAM in order to support the features in ExtremeWare version 6.0 or later.

To determine the memory size in your switch, use the following command:

```
show memory
```

For Summit switches running ExtremeWare 4.0 or later, the switch indicates the total DRAM size in megabytes as part of the output. For Summit switches running ExtremeWare releases before 4.0, you must calculate the memory by taking the sum of the bytes listed under `current free` and adding to it the bytes listed under `current alloc`. If the sum is greater than 16,000,000, there is no need to upgrade the memory on the switch. If this is not the case, please contact your supplier.

Port Connections

Summit "*i*" series switches use a combination of the following types of ports:

- Fixed ports
  - 1000BASE-LX optical ports using LC connectors
  - 1000BASE-SX optical ports using MT-RJ connectors
  - 10BASE-T/100BASE-TX copper ports using RJ-45 connectors
  - 100BASE-TX/1000BASE-T copper ports using RJ-45 connectors
- Modular ports using GBICs
  - 1000BASE-SX ports using 850 nm duplex SC connectors
  - 1000BASE-LX ports using 1300 nm duplex SC connectors
  - 1000BASE-LX70 ports using 1300 nm duplex LC connectors
  - 1000BASE-ZX
  - LX100
  - UTP ports using RJ-45 connectors
- Modular ports using mini-GBICs:
  - 1000BASE-SX mini-GBIC
  - 1000BASE-LX mini-GBIC
  - ZX mini-GBIC
  - 1000BASE-BX mini-GBIC

Table 17 lists port configurations available on the different Summit "*i*" series switch models.

Table 17: Port configurations on Summit "*i*" series switch models

	Fixed				Modular		
Ethernet Ports	**1000BASE-SX**	**1000BASE-LX**	**100/1000 BASE-T**	**10BASE-T/100BASE-TX**	**GBIC**	**Mini-GBIC**	**Redundant GBIC**
Switch Model							
Summit1i SX	6						
Summit1i TX			6		2		
Summit5i SX	12				2		
Summit5i LX					4		
Summit5i TX		12	12		4		
Summit7i SX	28				4		
Summit7i TX			28		4		
Summit48i				48	4		2
Summit48si				48	2	2	

Summit1i Switch

The Summit1i switch is 2U high; it is available in two port configurations:

- Six autosensing 100BASE-TX/1000BASE-T ports with RJ-45 connectors and two 1000BASE-X ports with SC connectors (Figure 35)
- Six 1000BASE-SX ports with MT-RJ connectors and two 1000BASE-X ports with SC connectors (Figure 36)

Figure 35: Front view of the Summit1i switch with 100BASE-TX/1000BASE-T ports

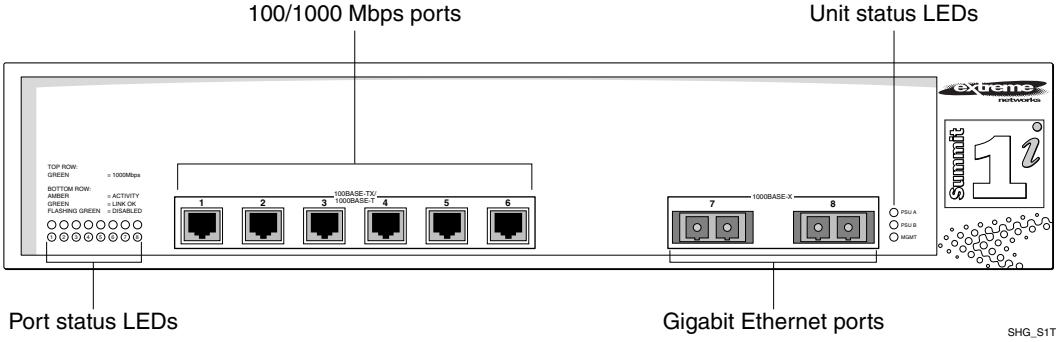
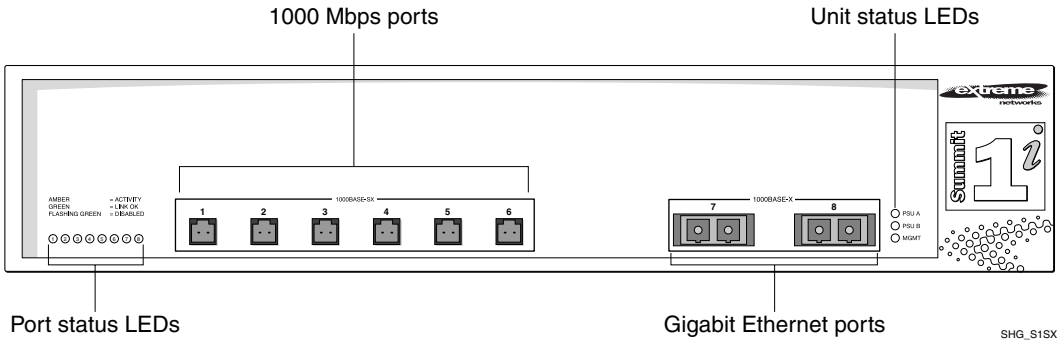


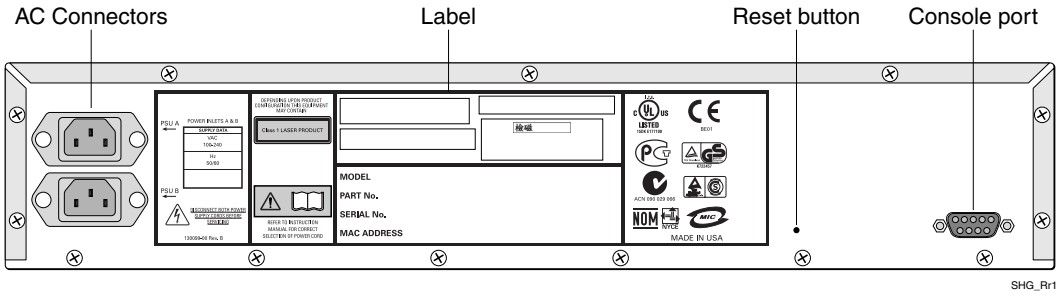
Figure 36: Front view of the Summit1i switch with 1000BASE-SX ports



The front panel of each Summit1i switch includes LEDs, six fixed 100/1000 Mbps or 1000 Mbps ports, and two unpopulated ports for installation of GBICs with SC connectors.

Figure 37 shows the rear panel of both available Summit1i switch models.

Figure 37: Rear view of the Summit1i switch



The Summit1i rear panel includes two AC power sockets, a system label, a reset button, and the console port.

LEDs

Both Summit1i models have the following LEDs:

- Unit status
- Management
- Port status
- Port speed

GBIC Ports

Both Summit1i switch models provide two unpopulated GBIC ports with SC connectors. You can use the following GBICs in the Summit1i switch:

- 1000BASE-SX
- 1000BASE-LX

- 1000BASE-LX70
- ZX GBIC
- LX100
- UTP GBIC

For more information about the supported GBIC types, see “GBIC Type and Hardware/Software Support” on page 23. For specifications of individual GBIC models, see “GBIC Specifications” on page 340.

Power Sockets

The Summit1i switch has built-in dual redundant power supplies. Each power supply has its own power socket. When the second power supply is connected to a second independent power source, both provide a redundant, load-shared power source to the Summit1i switch. If one of the power sources or power supplies fails, the second power supply provides all power needs, ensuring uninterrupted network operation.

CAUTION

Only trained service personnel should perform service on Summit1i power supplies.

Label

The label on the rear of the Summit1i switch displays important information about the switch. Write down the following information before you install the switch:

- Model number—Model number assigned to this device
- Part number—Part number assigned to this device
- Serial number—Manufacturing serial number for this device. Refer to the serial number when you contact Extreme Networks technical support
- MAC address—Unique Ethernet MAC address assigned to this device

Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

Console Port

Use the console port (9-pin, “D” type connector) for local management. This port allows you to attach a terminal for access to the CLI through a serial connection.

Summit5i Switch

The Summit5i switch is 2U high; it is available in three port configurations:

- 12 autosensing 100BASE-TX/1000BASE-T ports with RJ-45 connectors and 4 1000BASE-X ports with SC connectors (Figure 38)
- 12 1000BASE-SX ports with MT-RJ connectors and 4 1000BASE-X ports with SC connectors (Figure 39)
- 12 1000BASE-LX ports with either MT-RJ or LC connectors (Figure 40 shows LC connectors) and 4 1000BASE-X ports with SC connectors (Figure 40)

  To determine the type of connectors on your Summit5iLX switch, look at the serial number on the rear of the switch. Serial numbers that start with 0233 and **lower** have MT-RJ connectors. Serial numbers that start with 0234 and **higher** have LC connectors. For example, a Summit5iLX switch with the serial number 0234M-00012 has LC connectors.

Figure 38: Front view of the Summit5i switch with 100BASE-TX/1000BASE-T ports

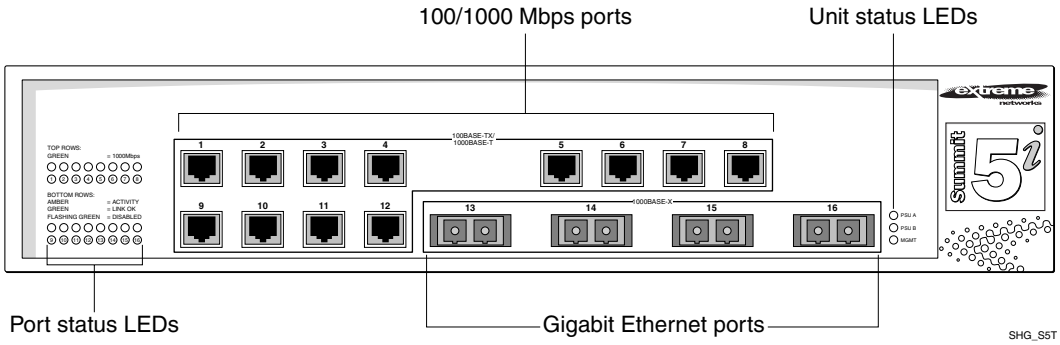


Figure 39: Front view of the Summit5i switch with 1000BASE-SX ports

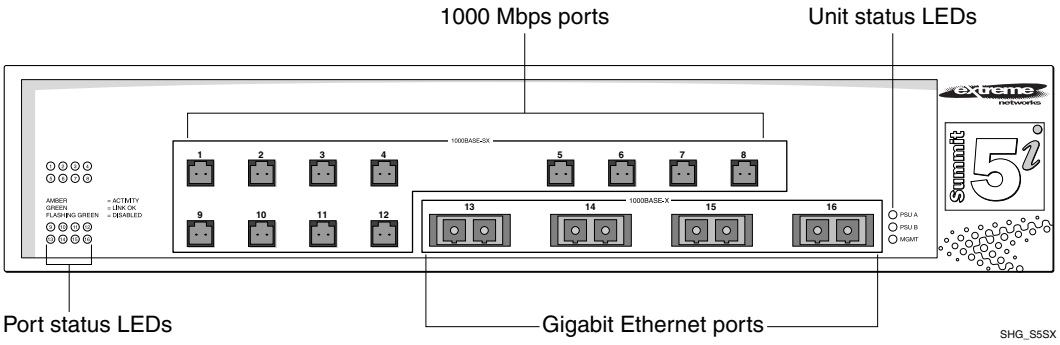
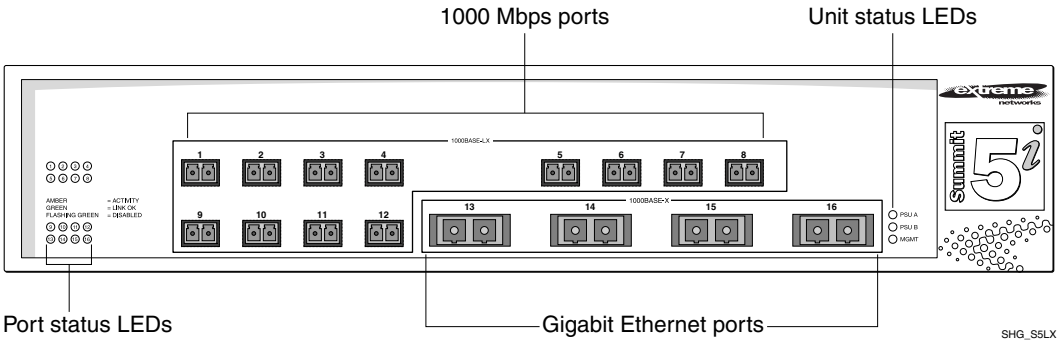


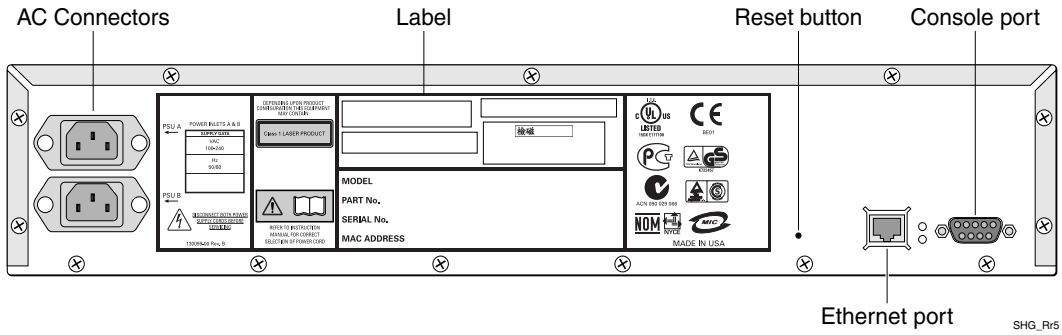
Figure 40: Front view of the Summit5i switch with 1000BASE-LX ports



The front panel of each Summit5i switch includes LEDs, 12 fixed 100BASE-TX/1000BASE-T, 1000BASE-SX, or 1000BASE-LX ports, and 4 unpopulated ports for installation of GBICs with SC connectors.

Figure 41 shows the rear view of the Summit5i switch.

Figure 41: Rear view of the Summit5i switch



The rear panel of the Summit5i switch includes two AC power sockets, a system label, a reset button, an Ethernet management port, and a serial console port.

LEDs

All three Summit5i models have the following LEDs:

- Unit status
- Management
- Port status
- Port speed
- Ethernet management port (on the rear panel)

For information about the LEDs and their activity on the Summit5i switch, see “Summit1i, Summit5i, Summit7i, and Summit48i Switch LEDs” on page 97.

GBIC Ports

All three Summit5i switch models provide four unpopulated GBIC ports with SC connectors. You can use the following GBICs in the Summit5i switch:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LX70
- ZX GBIC
- LX100
- UTP GBIC

For more information about the supported GBIC types, see "GBIC Type and Hardware/Software Support" on page 23. For specifications of individual GBIC models, see "GBIC Specifications" on page 340.

Power Sockets

The Summit5i switch has built-in dual redundant power supplies. Each power supply has its own power socket. When the second power supply is connected to a second independent power source, both provide a redundant, load-shared power source to the Summit5i switch. If one of the power sources or power supplies fails, the second power supply provides all power needs which ensures uninterrupted network operation.

NOTE

Only trained personnel should provide service for Summit5i switch power supplies.

Label

The label on the rear of the Summit5i switch displays important information about the switch. Write down the following information before you install the switch:

- Model number—Model number assigned to this device
- Part number—Part number assigned to this device
- Serial number—Manufacturing serial number for this device. Refer to the serial number when you contact Extreme Networks technical support.
- MAC address—Unique Ethernet MAC address assigned to this device

Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

Ethernet Management Port

Use the management port (10/100 Mbps Ethernet, RJ-45 connector) to plug an Ethernet cable directly from your laptop into the switch for out-of-band management. This port provides direct access into the switch and allows you to view and locally manage the switch configurations.

Console Port

Use the console port (9-pin, "D" type connector) for local management. This port allows you to attach a terminal and access the CLI through a serial connection.

Summit7i Switch

The Summit7i switch is 4U high; it is available in two port configurations:

- 28 autosensing 100BASE-TX/1000BASE-T ports with RJ-45 connectors and 4 1000BASE-X ports with SC connectors (Figure 42)
- 28 1000BASE-SX ports with MT-RJ connectors and 4 1000BASE-SX ports with SC connectors (Figure 43)

Figure 42: Front view of the Summit7i switch with 100BASE-TX/1000BASE-T ports

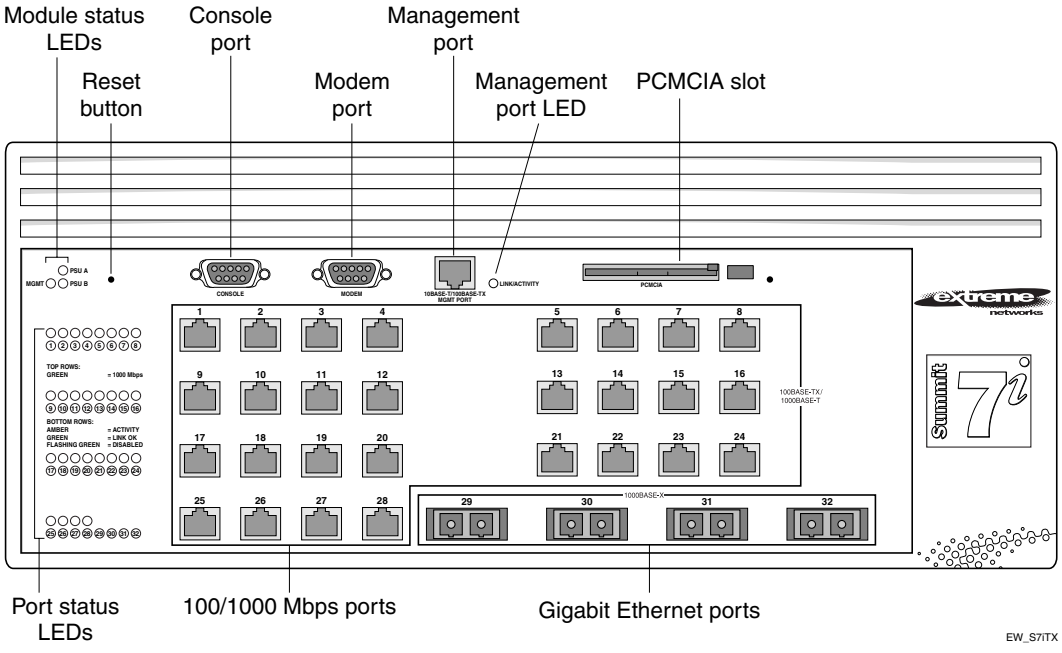
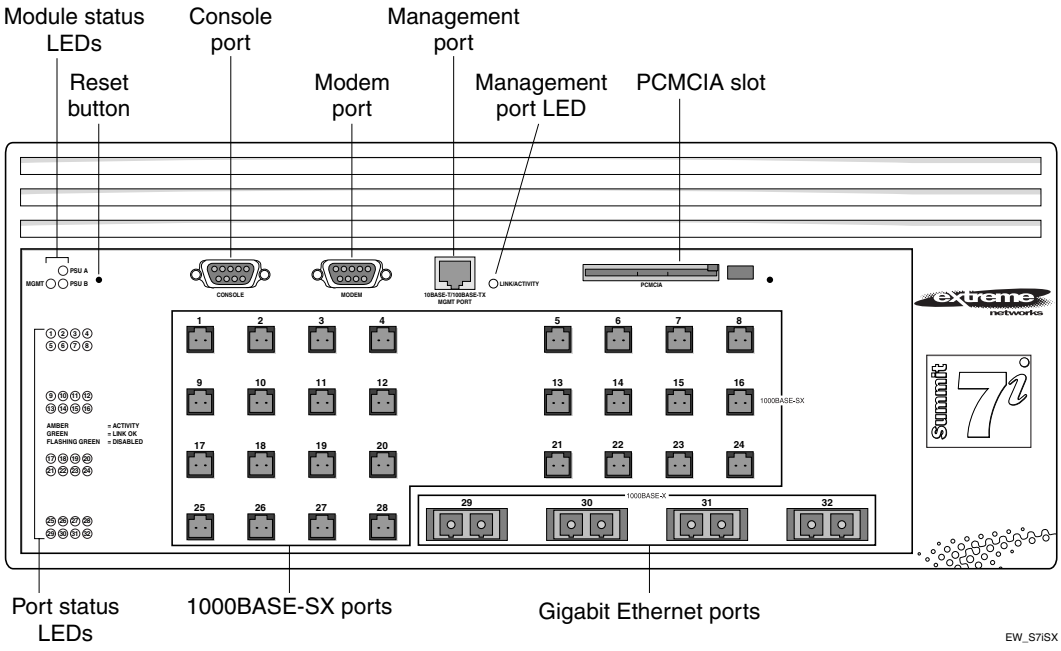


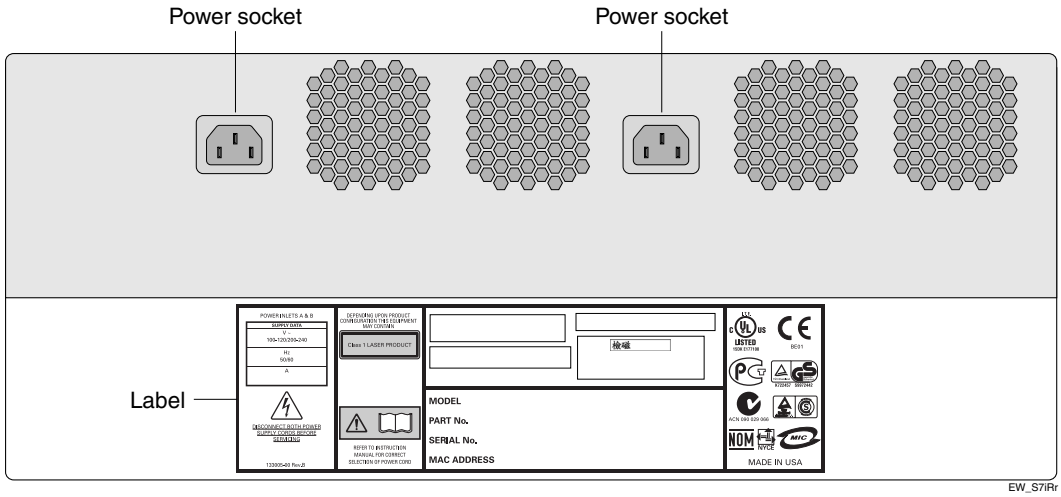
Figure 43: Front view of the Summit7i switch with 1000BASE-SX ports



The front panel of each Summit7i switch includes 28 fixed 100BASE-TX/1000BASE-T or 1000BASE-SX ports and four unpopulated ports for installation of GBICs with SC connectors. In addition, the front panel of the Summit7i switch has a reset button, serial console port, modem port, Ethernet management port, and PCM/CIA slot.

Figure 44 shows the rear view of both available Summit7i switch models.

Figure 44: Rear view of the Summit7i switch



The rear panel of the Summit7i switch includes two AC power sockets and the system label.

LEDs

Each Summit7i model has the following LEDs:

- Unit status
- Management
- Port status
- Port speed
- Management port

For information about the LEDs and their activity on the Summit7i switch, see “Summit1i, Summit5i, Summit7i, and Summit48i Switch LEDs” on page 97.

GBIC Ports

Both Summit7i switch models provide four unpopulated GBIC ports with SC connectors. You can use the following GBICs in the Summit7i switch:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LX70
- ZX GBIC
- LX100
- UTP GBIC

For more information about the supported GBIC types, see “GBIC Type and Hardware/Software Support” on page 23. For specifications of individual GBIC models, see “GBIC Specifications” on page 340.

Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

Console Port

Use the console port (9-pin, “D” type connector) for local management. This port allows you to attach a terminal and access the CLI through a serial connection.

Modem Port

Use the modem port to connect a modem for remote access to the command line interface (CLI).

Ethernet Management Port

Use the management port (10/100 Mbps Ethernet, RJ-45 connector) to plug an Ethernet cable directly from your laptop into the switch for out-of-band management. This provides you with direct access into the switch and allows you to view and locally manage the switch configurations.

See “Management Ports” in Chapter 1 for more information about the management port.

PCMCIA Slot

The PCMCIA slot is reserved for future use.

Power Sockets

The Summit7i switch has built-in dual redundant power supplies. Each power supply has its own power socket. When the second power supply is connected to a second independent power source, both provide a redundant, load-shared power source to the Summit7i switch. If one of the power sources or power supplies fails, the second power supply provides all power needs which ensures uninterrupted network operation.

NOTE

Only trained personnel should provide service for Summit7i switch power supplies.

Label

The label on the rear of the Summit7i switch displays important information about the switch. Write down the following information before you install the switch:

- Model number—Model number assigned to this device
- Part number—Part number assigned to this device
- Serial number—Manufacturing serial number for this device. Refer to the serial number when you contact Extreme Networks technical support
- MAC address—Unique Ethernet MAC address assigned to this device.

Summit1i, Summit5i, Summit7i, and Summit48i Switch LEDs

Table 18 describes the LED activity on the Summit1i, Summit5i, Summit7i, and Summit48i switches.

Table 18: Switch LED activity for the Summit1i, Summit5i, Summit7i, and Summit48i

LED	Color	Indicates
Unit Status LEDs		
PSU A, PSU B	Green	The indicated PSU is powered up.
	Amber	The indicated PSU has a failure.
	Green/Amber blinking	The AC power cable is not inserted correctly.
	Off	The PSU is not receiving power or no PSU is present.

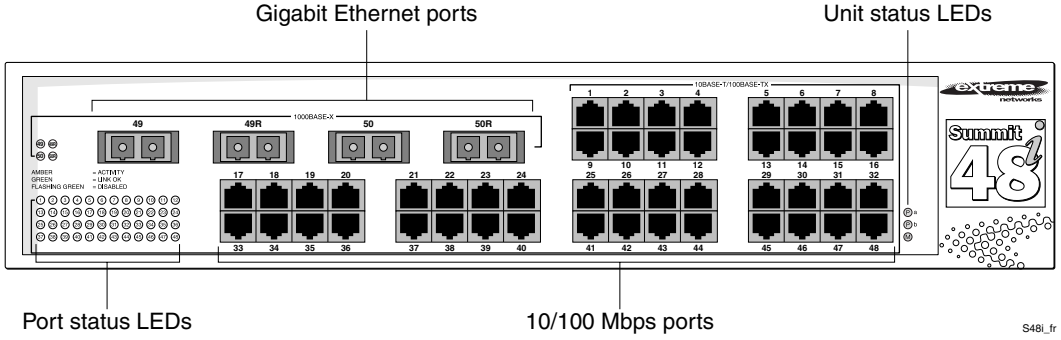
Table 18: Switch LED activity for the Summit1i, Summit5i, Summit7i, and Summit48i

MGMT	Green (solid)	Power On Self Test (POST) or Diagnostics. PMS in progress.
	Green (blinking slowly)	The switch is operating normally.
	Green (blinking quickly)	Software download is in progress.
	Amber	The switch has failed its POST or is experiencing an overheat or fan failure.
Port Status LEDs		
	Green	Link is present; port is enabled.
	Amber	Frames are being transmitted/received on this port.
	Green blinking	Link is present; port is disabled.
	Off	Link is not present.
100/1000 Mbps Speed LEDs		
	Green	Port is operating at 1000 Mbps.
	Off	Port is operating at 100 Mbps.
10/100 Management Port LED (Summit5i and Summit7i)		
	Green	Link is present.
	Amber	Frames are being transmitted.
	Off	Link is not present.

Summit48i Switch

The Summit48i switch is 2U high. It has 48 autosensing 10BASE-T/100BASE-TX ports and 4 1000BASE-X ports with SC connectors (Figure 45).

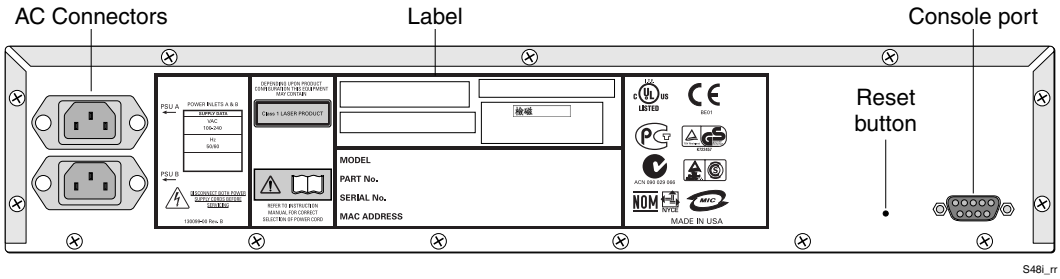
Figure 45: Front view of the Summit48i switch



The front panel includes LEDs, 28 fixed ports, and 4 unpopulated ports for installation of GBICs with SC connectors

Figure 46 shows the rear panel of the Summit48i switch.

Figure 46: Rear view of the Summit48i switch



The rear panel of the Summit48i switch includes AC power sockets, a system label, a reset button, and a serial console port.

LEDs

The Summit48i switch has the following LEDs:

- Unit status
- Management
- Port status
- Port speed

For information about the LEDs and their activity on the Summit48i switch, see "Summit1i, Summit5i, Summit7i, and Summit48i Switch LEDs" on page 97.

GBIC Ports

The Summit48i switch has four unpopulated ports for installing GBICS with SC connectors. These four ports provide two Gigabit Ethernet ports and two redundant Gigabit Ethernet ports. You can use the following GBICs in the Summit48i switch:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LX70
- ZX GBIC
- LX100
- UTP GBIC

For more information about the supported GBIC types, see "GBIC Type and Hardware/Software Support" on page 23. For specifications of individual GBIC models, see "GBIC Specifications" on page 340.

Power Sockets

The Summit48i switch has built-in dual redundant power supplies. Each power supply has its own power socket. When the second power supply is connected to a second independent power source, both provide a redundant, load-shared power source to the Summit48i switch. If one of the power sources or

power supplies fails, the second power supply provides all power needs, ensuring uninterrupted network operation. The switch also sends:

- A message to the syslog to indicate which power supply failed
- An SNMP trap to your network management station

NOTE

Only trained personnel should provide service for Summit48i switch power supplies.

Label

The label on the rear of the Summit48i switch displays important information about the switch. Write down the following information before you install the switch:

- Model number—Model number assigned to this device
- Part number—Part number assigned to this device
- Serial number—Manufacturing serial number for this device. Refer to the serial number when you contact Extreme Networks technical support
- MAC address—Unique Ethernet MAC address assigned to this device

Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

Console Port

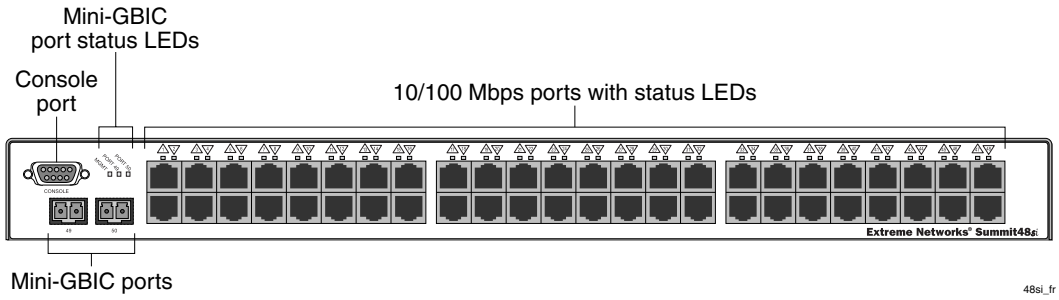
Use the console port (9-pin, "D" type connector) for local management. This port allows you to attach a terminal and access the CLI via a serial connection.

Summit48si Switch

The Summit48si switch is 1U high. It has 48 autosensing 10BASE-T/100BASE-TX ports and 2 mini-GBIC ports with LC connectors.

Figure 47 shows the front view of the Summit48si switch.

Figure 47: Front view of the Summit48si switch



The front panel of the Summit48si switch includes LEDs, 48 fixed ports, 2 unpopulated ports for installing mini-GBICs with LC connectors, and a serial console port.

Figure 48 shows a close-up view of the Summit48si LEDs and ports.

Figure 48: LEDs and ports on the Summit48si switch

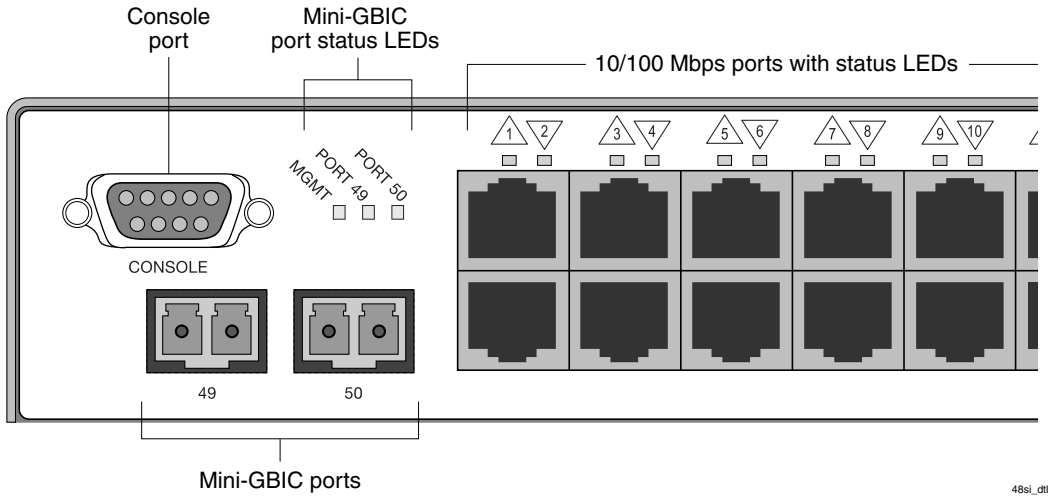
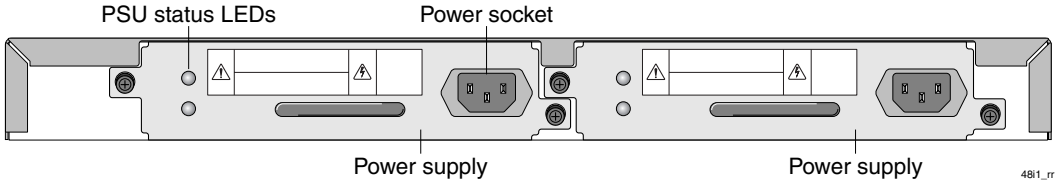


Figure 49 shows the rear panel of the Summit48si switch.

Figure 49: Rear view of the Summit48si switch

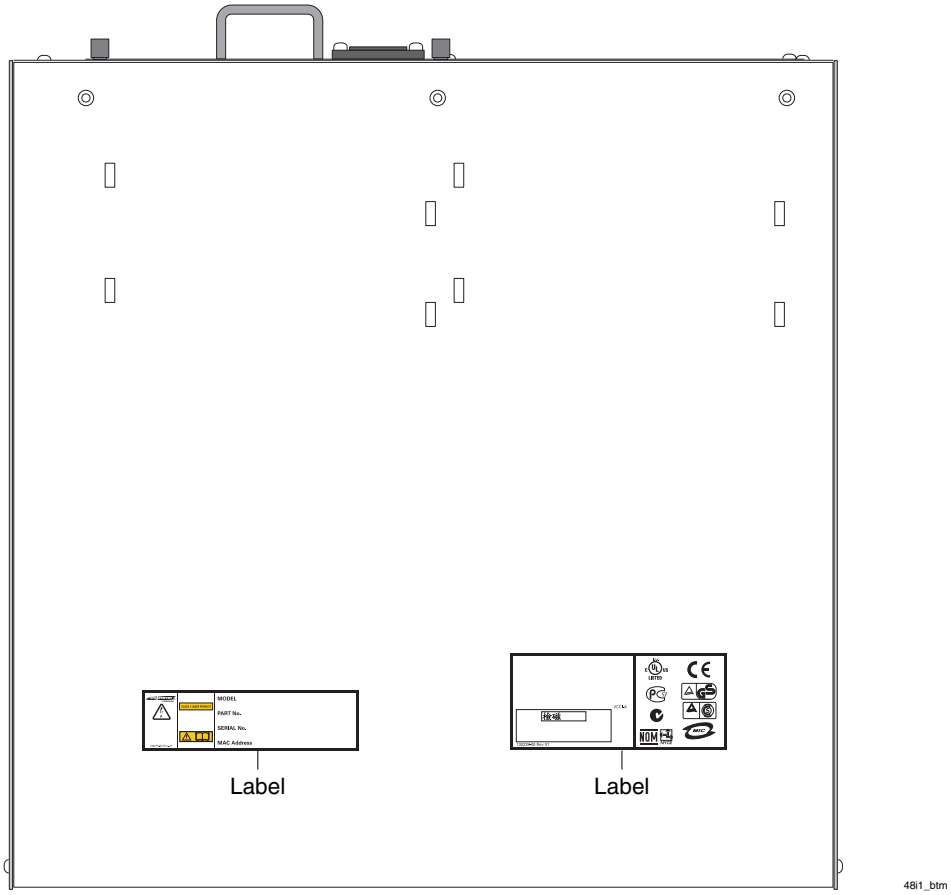


The rear panel of the Summit48si switch includes one or two installed power supplies, each with its own AC power socket.

NOTE

The label that indicates country and safety certifications for the Summit48si switch is located on the bottom of the switch (Figure 50).

Figure 50: System labels on the Summit48si switch



LEDs

The Summit48si switch has the following LEDs:

- Management
- Port status

For information about the LEDs and their activity on the Summit48si switch, see “Summit48si Switch LEDs” on page 105.

Mini-GBIC Ports

The Summit48si switch has two unpopulated ports that use Extreme mini-GBIC ports with LC connectors. You can use the following mini-GBICs in the Summit48si switch:

- 1000BASE-SX mini-GBIC
- 1000BASE-LX mini-GBIC
- ZX mini-GBIC
- 1000BASE-BU mini-GBIC

Use only Extreme Networks-certified mini-GBICs, available from Extreme Networks, in the mini-GBIC port in the switch.

For more information about the supported mini-GBIC types, see "Mini-GBIC Type and Hardware/Software Support" on page 23. For specifications of individual GBIC models, see "Mini-GBIC Specifications" on page 343.

Console Port

Use the console port (9-pin, "D" type connector) for local management. This port allows you to attach a terminal and access the CLI via a serial connection.

Power Supplies

The Summit48si switch supports two hot-insert power supplies, either AC, shown in Figure 51, or DC, shown in Figure 52, with one power supply preinstalled at the factory. Extreme Networks recommends upgrading to ExtremeWare v7.1 or later to use the following features:

- Use the `show switch` command to indicate the type of power supply (AC or DC) installed.
- A warning is printed if an AC and DC power supply are installed in the same switch. This is not a supported configuration.
- An SNMP trap message is sent when the power supply is hot swapped.

You can remove or install Summit48si power supplies—one at a time—without interrupting operation. Each power supply has its own power socket, allowing you to connect independent power sources for each power supply. One functioning power supply must always be installed. Two power supplies operate in a load-sharing manner and increase the reliability of the switch.

NOTE

You can use either DC or AC power supplies in the Summit48si, but you cannot install an AC and a DC power supply in the same switch. See Chapter 4 for information about removing and installing power supplies.

Figure 51: Summit48si AC power supply

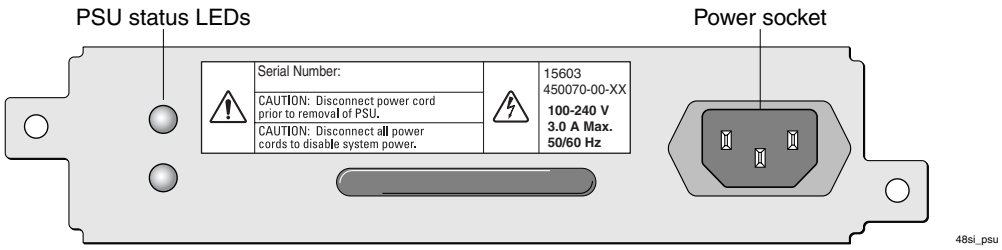
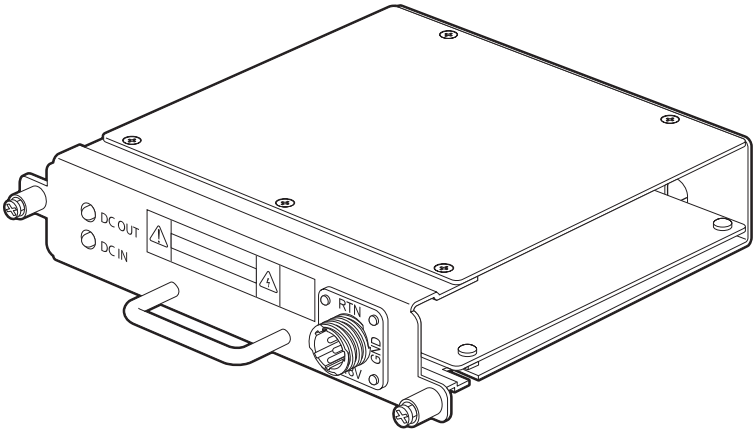


Figure 52: Summit48si DC power supply



If one power supply fails, or if source power to one of the power supplies fails, the second power supply takes over, ensuring uninterrupted network operation. The switch also sends:

- A message to the syslog telling you which power supply failed
- An SNMP trap to your network management software both when a power supply fails and when a power supply is hot swapped

Labels

The labels on the bottom of the Summit48si switch display important information about the switch. Write down the following information before you install the switch:

- Model number—Shows the model number assigned to this device
- Part number—Shows the part number assigned to this device
- Serial number—Refer to the serial number when you contact Extreme Networks technical support
- MAC address—Shows the unique Ethernet MAC address assigned to this device

Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

Summit48si Switch LEDs

The Summit 48si switch has LEDs on the front panel that indicate switch operating status and port status. The switch power supplies at the back of the switch also have LEDS.

Table 19 describes the front-panel LEDs on the Summit48si switches.

Table 19: Switch LED activity for the Summit48si switch

LED	Color	Indicates
Unit Status LEDs		
MGMT	Green	The switch is operating normally.
		Power On Self Test (POST) or software download in progress.
	Amber	The switch has failed its POST or is experiencing an overheat or fan failure.
10/100 Mbps Port Status LEDs		
	Green	Link is present; port is enabled.
	Green blinking	Link is present; port is disabled.
	Off	Link is not present.
Mini-GBIC Port Status LEDs		
	Green	Link is present; port is enabled.
	Amber	Frames are being transmitted/received on this port.
	Green blinking	Port is disabled.
	Off	Link is not present.

Table 20 describes the LEDs on the Summit48si AC power supply.

Table 20: AC power supply LED activity for the Summit48si

LED	Color	Indicates
PSU Status LED	Green	AC input is above a minimum threshold, or no PSU is present.
	Amber	The PSU is not receiving adequate power.
	Off	No power is present.

Table 21 describes the LEDs on the Summit48si DC power supply.

Table 21: DC power supply LED activity

LED	Color	Indicates
DC out	Green	All DC outputs are operational
	Amber	One or more DC outputs have failed
	Off	Input voltage is not present
DC in	Green	Input voltage is within range
	Off	Input voltage is not applied, DC input voltage is not within specification, or input fuse is burned out

4 Summit Switch Installation

This chapter describes how to install Summit switches and optional equipment.

You can mount the Summit switch in a rack or place it free-standing on a tabletop.

This chapter describes:

- Mounting the Switch in a Rack on page 108
- Placing the Switch on a Table or Shelf on page 112
- Installing a Summit Stacked Configuration on page 112
- Verifying a Successful Installation on page 114
- Removing the Switch from a Rack on page 115

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove any Summit switch or before you attempt to install or remove the Summit48si power supplies.

CAUTION

Use of controls or adjustments of performance or procedures other than those specified herein can result in hazardous radiation exposure.

Installation Summary

Installing a Summit switch includes the following tasks:

1. Mount the switch in a rack (see next section) or set it on a table or appropriate shelf (page 112).
2. If necessary, install additional power supplies (Chapter 5)
   - External AC power supply for the Summit 300-24
   - Redundant internal AC power supply for the Summit 300-48 or Summit48si
   - Redundant DC power supply for the Summit48si
3. Connect power cables to the switch. If there is a power switch, move it to the on position.
4. Verify successful installation (page 114).

5 For a stacked configuration, enable stacking on each switch and connect the stacking cables as described on page 112.

Mounting the Switch in a Rack

To mount the Summit switch in a rack, you need the following tools, equipment, and resources:

- Helper bracket (provided with the Summit7i switch)
- A minimum of four appropriate screws to secure the helper bracket (not provided)
- Mounting brackets (provided)
- A minimum of four appropriate screws (not provided) to secure the switch into the rack
- # 1 Phillips screwdriver
- If you have a Summit7i switch, a minimum of two people to help install the switch into the rack

CAUTION

Do not use the rack mount kits to suspend the switch under a table or desk, or to attach the switch to a wall.

To mount the Summit switch in a standard 19-inch (48.26 cm) rack:

1 If you are installing a Summit7i switch, mount the helper bracket in the rack, as shown in Figure 53. Use four screws (not provided) that are appropriate to your rack type.

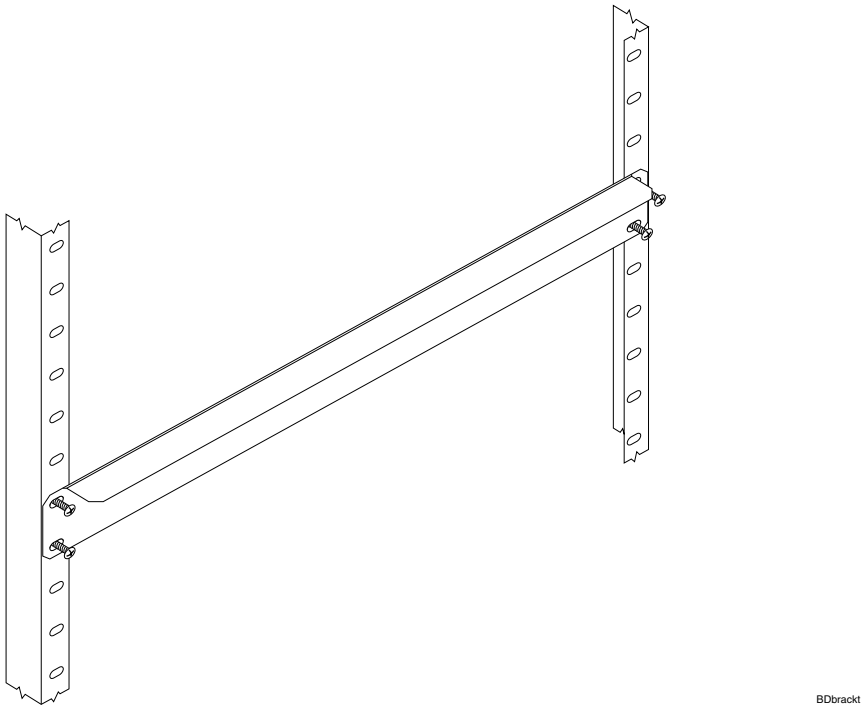
NOTE

The Summit7i switch can weigh up to 55 pounds (24.9 kg).

NOTE

Only the Summit7i switch uses the helper bracket. The helper bracket is not required to rack mount a Summit1i, Summit5i, Summit48i, or Summit48si switch.

Figure 53: Helper bracket for the Summit7i switch



2 Place the switch shipping box upright on a secure, flat surface, with the front of the switch facing you.

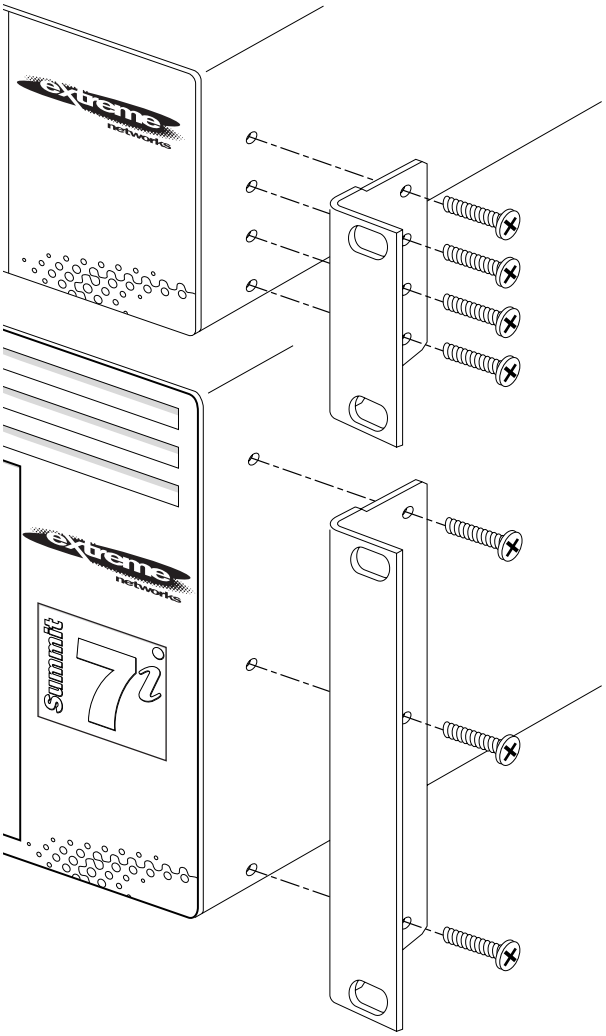
3 Remove the switch from the box, and remove the packing material from the switch.

4 Remove the existing screws from the sides of the case (retain the screws for Step 6).

5 Place a mounting bracket over the mounting holes on one side of the unit.

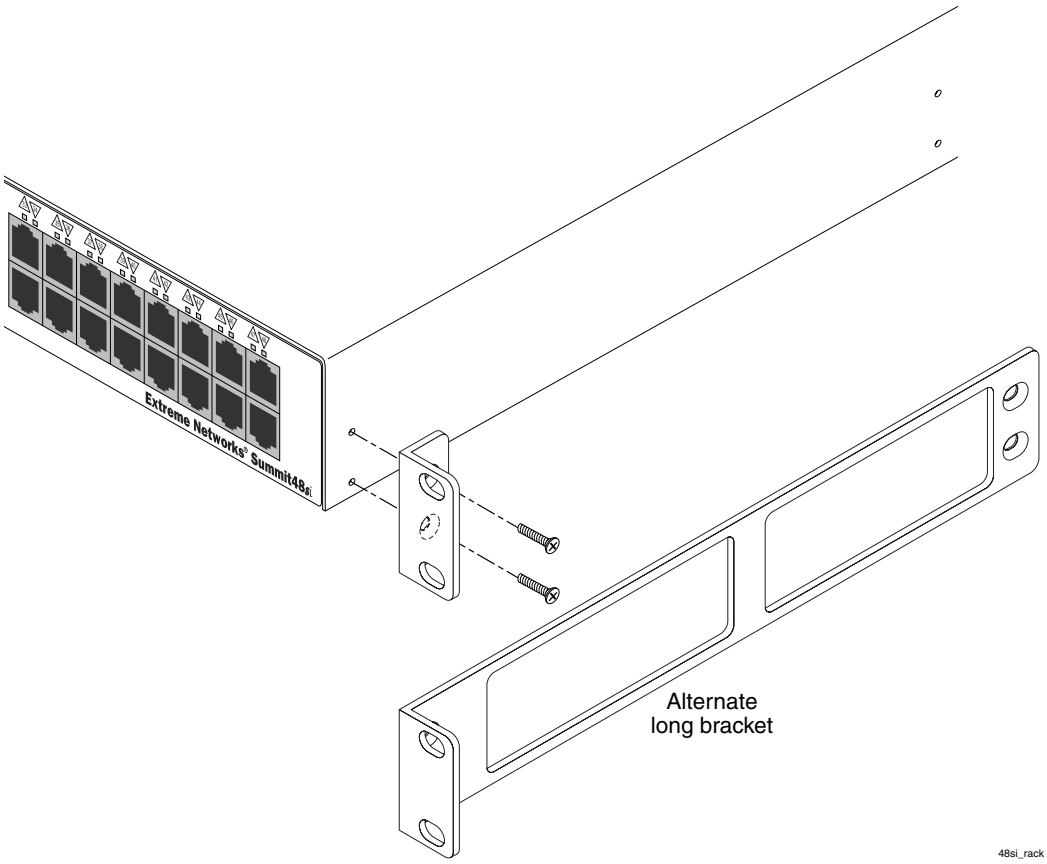
6 Insert and tighten the screws using a suitable screwdriver, as shown in Figure 54 and Figure 55.

Figure 54: An example of fitting the mounting bracket into the switch



EW_rack

Figure 55: Fitting the mounting bracket into the Summit48si switch



7 Repeat steps 4 through 6 for the other side of the switch.

8 Insert the switch into the rack, and ensure that ventilation holes are not obstructed.

If you are installing a Summit7i switch, you need a minimum of two people to help lift and place the switch on the helper bracket, and slowly guide the switch into the rack.

9 While holding the switch, secure it with suitable screws (not provided).

If you are installing a Summit7i switch, remove the helper bracket after you secure the chassis.

10 Connect the Summit switch to a redundant power supply (if applicable).

11 To turn on power to a Summit 200 series switch, a Summit 400 series switch, a Summit 300-24 switch, or an "*i*" series Summit switch, connect the AC power cable(s) to the switch and then to the wall outlet(s).

To turn on power to a Summit 300-48 switch, connect all power cables between the switch and the AC power source. Then turn all power switches to the ON position.

NOTE

Only the Summit 300-48 switches have on/off switches.

Placing the Switch on a Table or Shelf

You can place up to four Summit switches on top of one another.

The Summit switch comes with four self-adhesive rubber pads. Apply the pads to the underside of each switch, placing a pad at each marked corner of the switch. Place the switches on top of one another, ensuring that the corners align.

Installing a Summit Stacked Configuration

Summit "*e*" series switches can be installed in a stacked configuration that functions as a single switch entity for management. The Summit "*e*" series switches that support stacking are the Summit 200 series switches, Summit 400 series switches, and the Summit 300-24 switch.

For information about determining the number of switches allowed in a stack, see "Maximum Switches in a Stack" on page 41.

Figure 56 shows a typical stacked configuration using Summit 400 series switches, and Figure 57 shows a typical stacked configuration using Summit 200 and 300 series switches.

Figure 56: Typical Summit 400 series stacked configuration

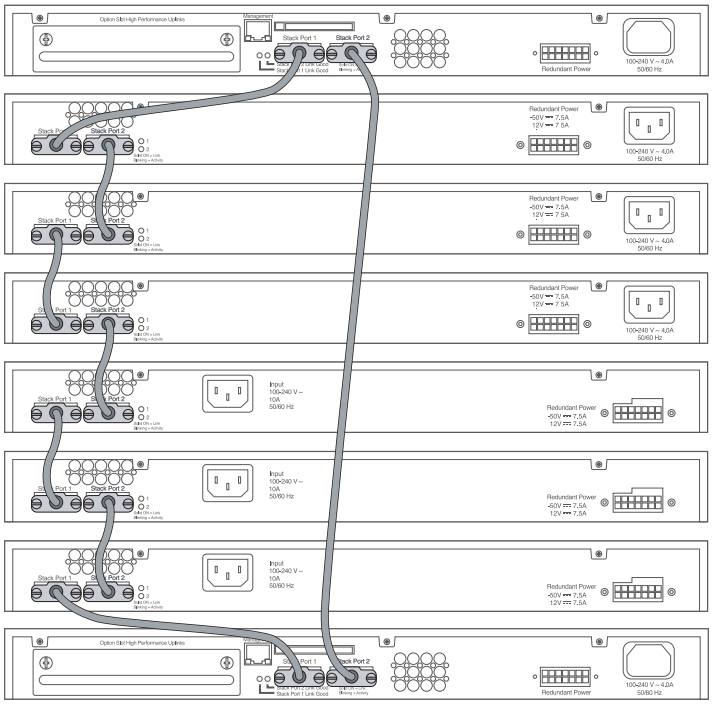
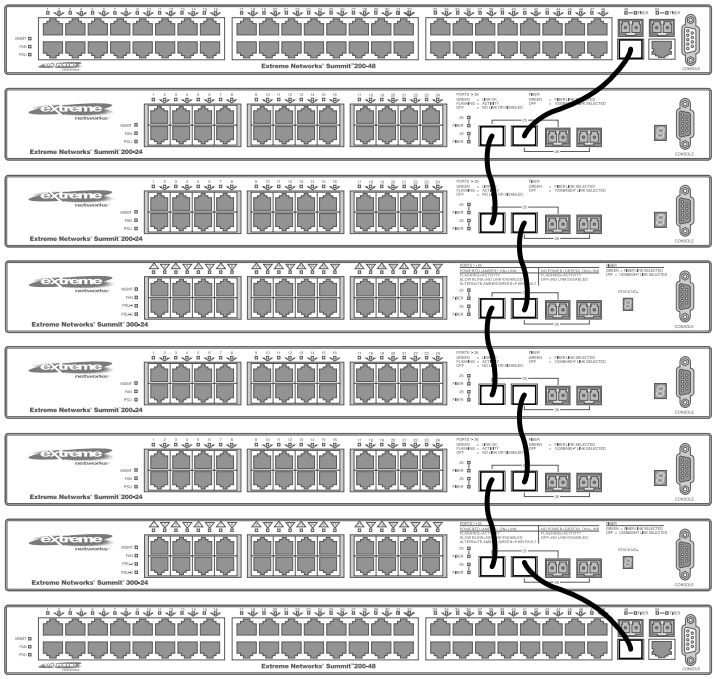


Figure 57: Typical Summit 200 and 300 stacked configuration



To install a stacked configuration:

1. Install the individual switches as described previously, either in a rack or on a table or shelf.
2. Power on the switches.
3. Connect to the console port of each switch and configure stacking for that switch. For information about configuring stacking operation, see the *ExtremeWare Software User Guide* and the *ExtremeWare Command Reference Guide*.
4. Interconnect the switches using the 1-gigabit Ethernet ports on the front of the switches or the dedicated stacking ports on the backs of the Summit 400 switches. Table 22 shows the stacking ports for each switch model.

   For information about using the dedicated stacking ports on the Summit 400 series switches, see "Connecting Summit 400 Series Switches" on page 114.
5. Enable stacking. The system reboots.

   For information about enabling stacking, see the *ExtremeWare Software User Guide* and the *ExtremeWare Command Reference Guide*.

Table 22: Stacking ports on Summit "e" series switches

Switch Model	Ports
Summit 200-24	25, 26
Summit 200-48	49, 50
Summit 300-24	25, 26
Summit 400-24t/24p	Stacking ports 25, 26 on the back, or any Gigabit Ethernet port on the front
Summit 400-48t	Stacking ports 52, 53 on the back, or any Gigabit Ethernet port on the front

Connecting Summit 400 Series Switches

The dedicated stacking ports on the back of a Summit 400 series switch require a specific stacking cable that is available from Extreme Networks. To connect the stacking ports on two Summit 400 series switches, follow these steps:

1. Align the stacking cable connector with a stacking port on one switch.
2. Press the cable connector firmly into its mating connector until the cable connector is firmly seated.
3. Align and tighten the connector retaining screws.
4. Repeat steps 1 through 3 to connect the other end of the cable to a stacking port on the other switch.

Connecting Summit 200 Series and Summit 300-24 Switches

Summit 200 series and Summit 300-24 switches use the 1-gigabit Ethernet ports on the front of the switch for stacking interconnection. The cable used depends on the specific type of installed GBIC or mini-GBIC in the port. For more information about the cables to use with these ports, see "GBIC types and maximum distances" on page 340.

To connect two Summit 200 series or 300 series switches for a stacking configuration, follow these steps:

1. Use an alcohol wipe or other appropriate cleaning agent to clean the cable connectors; make sure they are free of dust, oil, and other contaminants.
2. On the first switch, align the transmit (Tx) and receive (Rx) connectors with the correct corresponding connectors on a fiber stacking port.
3. Press the cable connectors into their mating connectors on the port until the cable connector is firmly seated.
4. Repeat steps 2 and 3 to connect the cable to a fiber stacking port on the second switch.

Verifying a Successful Installation

After you supply power to the Summit switch, the switch performs a power-on self test (POST).

During the POST:

- All ports are temporarily disabled.
- The packet LED is off.
- The power LED is on.
- The MGMT LED flashes until the switch successfully passes the POST.

If the switch passes the POST, the MGMT LED blinks at a slow rate (one blink per second). If the switch fails the POST, the MGMT LED shows a solid yellow light.

NOTE

See Chapter 3 for more information about Summit LED activity.

Removing the Switch from a Rack

To remove the Summit switch from a rack, you need the following tools, equipment, and resources:

- Helper bracket (provided with the Summit7i switch)
- A minimum of four appropriate screws to secure the helper bracket (not provided)
- # 1 Phillips screwdriver
- If you have a Summit7i switch, a minimum of two people to help remove the switch from the rack

To remove the Summit switch from a standard 19-inch (48.26 cm) rack:

1. For AC-powered switches, unplug the power cable(s) from the from the wall outlet(s) and then from the switch.

   For a DC-powered Summit48si, disconnect the keyed DC cable connector from each installed power supply.
2. Disconnect the Summit switch from the redundant power supply (if applicable).
3. If you are removing a Summit7i switch, mount the helper bracket in the rack directly beneath the switch using four screws that are appropriate for your rack.
4. Unscrew the chassis from the rack.
5. Have a minimum of two people carefully remove the chassis from the rack and place it on a secure, flat surface with the front of the chassis facing you.
6. Unscrew the helper bracket and remove it from the rack.

5 Installing and Connecting Summit Power Supplies

The Summit switch models are shipped with internal power supplies that supply all the power needed for most switch operation. To provide full power support for PoE operation, you can connect external redundant power supplies to the Summit 300-24, the Summit 400-24p, the Summit 400-24t, and the Summit 400-48t.

The Summit 300-48 switch is shipped with one installed 600-Watt power supply. If a switch has only one power supply installed, you can add a second power supply to provide power load sharing and increased support for PoE operation.

The Summit48si switch is shipped with one installed AC or DC power supply. You can add a second power supply to provide power load sharing.

This chapter includes the following topics:

- Installing or Removing an External Power Supply 45019 (EPS-LD) on page 118
- Installing and Removing the Internal 600 Watt AC Power Supply (15412) on page 121
- Installing and Removing Summit48si AC Power Supplies on page 127
- Installing the AC Power Cable Retaining Bracket on page 129
- Installing the Summit48si Switch DC Power Supply on page 132

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove any of the Summit power supplies.

CAUTION

Use of controls or adjustments of performance or procedures other than those specified herein can

Installing or Removing an External Power Supply 45019 (EPS-LD)

The Extreme Networks External Power Supply 45019 (EPS-LD) provides additional power to switches that support Power over Ethernet (PoE), such as the Summit 300-24 and Summit 400-24p. The EPS-LD provides 465 W total power with 375 W dedicated for PoE applications. When attached to the Summit 300-24 or Summit 400-24p, the EPS-LD acts as a redundant power supply. The wattage is sufficient to power all ports on the Summit 300-24 and Summit 400-24p models.

The external power supply box contains the following items:

- One EPS-LD unit
- Mounting hardware, including screws
- One AC power cable for use in North America.
- One EPS-LD cable (1 meter long) for connecting the power supply to the switch.

NOTE

If you are using the EPS-LD outside North America, the input power cord must have an IEC320-C14 connector and the appropriate power input plug for the country in which you are operating. The cord must be 10 feet or less and at least 16-gauge copper wire.

CAUTION

Only trained service personnel should install or remove the Extreme EPS-LD unit, in accordance with the installation instructions. Before servicing this system, please read the safety information provided in Appendix A. Not following these precautions can result in equipment damage or shock.

The EPS-LD unit can be mounted in a rack or placed free-standing on a tabletop. You can mount the EPS-LD facing either the front or the back of the rack. For this reason, each unit has two sets of mounting holes, two on each end. Mount the EPS-LD so that the unit's output connectors are on the same side as the external connector on the connecting switch.

CAUTION

Do not use the rack-mount kits to suspend the EPS-LD from under a table or desk, or to attach the switch to a wall.

Rack-mounting the EPS-LD unit

NOTE

When installing an EPS-LD in a rack, make sure air vents are not restricted. Allow for elevated ambient operating temperatures when the EPS-LD is installed adjacent to other equipment. Be sure you mount the equipment within the rack so that the load is evenly distributed.

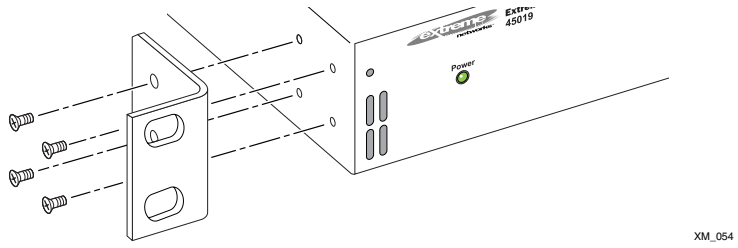
To install the EPS-LD, you need the following tools and materials:

- Electrostatic strap
- #1 Phillips screwdriver

To rack mount each EPS-LD unit:

1 Place the EPS-LD unit upright on a hard flat surface, with the side you want to face to the front of the switch toward you.
2 Remove the mounting bracket kit (including screws) from the packaging.
3 Locate a mounting bracket over the mounting holes on one side of the unit.
4 Insert the screws as shown in Figure 58, and fully tighten the screws with a #1 Phillips screwdriver.

Figure 58: Fitting the mounting bracket



5 Repeat steps 3 and 4 for the other side of the EPS-LD unit.
6 Insert the EPS-LD unit into a 19-inch rack.

NOTE

Mount the EPS-LD so that the output connectors are on the same side as the external connector on the connecting switch. If you mount the EPS-LD with the connectors facing in the opposite direction as the Extreme switch connector, leave at least 1 U between the switch and the EPS-LD through which to slide the cables. Do not route the cables around the equipment rack.

7 Insert the screws into the rack and the mounting bracket on both sides of the unit and fully tighten with a suitable screwdriver.

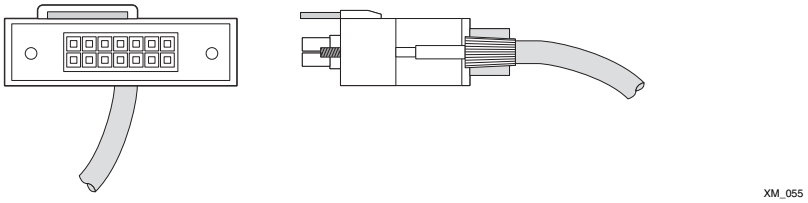
Connecting the EPS-LD to the Switch

CAUTION

Do not attach the AC power cord to the EPS-LD unit until the unit is properly grounded at the electrical outlet and the redundant power supply cable is connected.

One end of the EPS-LD cable has a keyed connector to ensure correct alignment of the connector (Figure 59). The key is a plastic tab on the cable connector housing that fits into the EPS-LD unit.

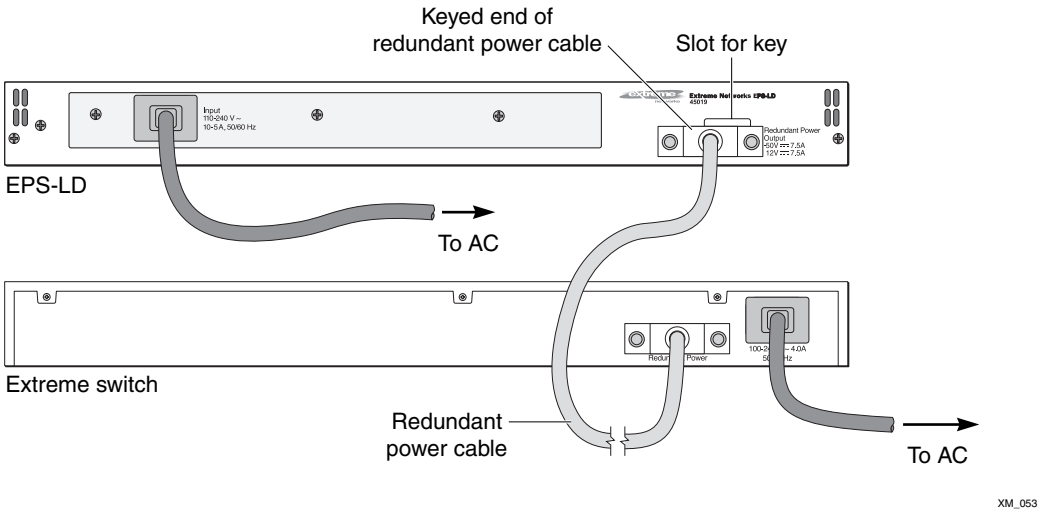
Figure 59: EPS-LD cable with key



To connect the EPS-LD cable:

1 Connect the keyed end of the EPS-LD cable to the power supply unit.
See Figure 60 to locate the connectors on the EPS-LD unit and on the switch.
2 Align and tighten the captive retaining screws on the connector.
3 Connect the other end of the EPS-LD cable to the Extreme switch.
The connector fits in only one direction.

Figure 60: Connecting an EPS-LD unit to a switch



Connecting the EPS-LD to Power

Make sure the EPS-LD is connected to the switch before you connect the AC power.

CAUTION

The EPS-LD unit does not have a switch for turning the unit on and off. You disconnect power to the EPS-LD unit by removing the plug from the electrical outlet. Ensure that this connection is easily accessible to you.

NOTE

Consider all the equipment connected to the power supply circuit to ensure that the circuit is not overloaded. Use proper over-current protection, such as a circuit breaker, to prevent over-current conditions.

To connect the EPS-LD to power:

1 Connect the AC input power cable to the AC connector on the EPS-LD unit.
2 Connect the other end of the AC cable to the electrical outlet.
Make sure the electrical outlet is properly grounded.

The Power LED on the front of the EPS-LD unit turns solid green to indicate that it is ready. Table 23 shows the possible LED status for the power supply.

Table 23: LED status for EPS-LD Power LED

Power LED	Indicates
Green, solid	The external power supply is operating normally.
Off	The external power supply is not connected.

Removing an EPS-LD unit

To remove an EPS-LD unit:

1. Disconnect the AC power by removing the plug from the wall.
2. Disconnect the AC power cord from the EPS-LD unit.
3. Disconnect the cable between the Extreme switch and the EPS-LD unit.
4. Remove the screws from the EPS-LD mounting brackets.
5. Slide the EPS-LD unit out of the rack.

Installing and Removing the Internal 600 Watt AC Power Supply (15412)

The Summit 300-48 600 Watt AC power supply (15412) is designed to be used in the Summit 300-48 switch. While powering the Summit 300-48, the 600 W power supply is capable of providing 450 W of power to Power over Ethernet (PoE) devices connected to the 48 primary PoE ports. Refer to the Summit 300-48 Release Notes to determine the total available power at each port. You can obtain copies of these documents at the Extreme Networks web site at:

http://www.extremenetworks.com/services/

The switch has two power supply bays, so a redundant power supply can be installed. When used in redundant mode, the power supplies are hot-swappable. You can add a second power supply without powering off the switch. If redundant power supplies are installed, you can remove one of them without powering off the switch.

This section includes the following procedures:

- Installing an Internal 600-Watt Power Supply on page 122
- Removing an Internal Power Supply on page 123
- Installing a cable retaining bracket
- Removing cable retaining bracket

The Summit 300-48 comes with a minimum of one power supply pre-installed at the factory. Switches with one power supply have a metal cover plate in place of the second supply. If you install a second power supply, be sure to retain the cover plate in case you later decide to use only one supply.

Installing an Internal 600-Watt Power Supply

The shipping container for the internal power supply contains the following items:

- One 600-watt power supply for the Summit 300-48
- Mounting hardware, including screws
- One AC power cable for use in North America

NOTE

If you are using the Summit 300-48 outside North America, the input power cord must have an IEC60320-C13 connector and the appropriate power input plug for the country in which you are operating. The cord must be 10 ft. or less in length and at least 18 gauge stranded copper wire.

CAUTION

Only trained service personnel should install or remove the Summit 600-watt power supply, in accordance with the installation instructions. Before servicing this system, be sure to read the safety information provided in Appendix A. If you do not follow these precautions, it can result in equipment damage or shock.

To install an internal Summit 300-48 power supply:

1. Confirm that the power supply switch on the power supply to be installed is set to the OFF position.
2. Make sure there is not a power supply cable connected to the power supply to be installed.
3. Remove the blank cover plate from the power supply bay.

   If you are replacing a faulty power supply, remove the faulty supply as described on page 123.

WARNING!

Do not insert your fingers or hands into the empty power supply bay.

4. Slide the power supply into the bay.
5. Tighten the two captive retaining screws using a #2 Phillips screwdriver.
6. If a power cable retaining bracket is required, install it as described in "Installing the AC Power Cable Retaining Bracket" on page 129. Otherwise, connect the power cable to the power supply and then to the power source.

   WARNING!

   Do not turn on the power to the power supply unless the power supply is installed in the switch.

7. Set the power supply switch to the ON position.
8. Keep the cover plate and power supply packaging for future use.

Removing an Internal Power Supply

To remove an internal Summit 300-48 power supply:

1 Turn off the power supply by setting the power switch to the OFF position.

2 Disconnect the power cable from the power source

3 If a power cable retaining bracket is installed, remove it as described in "Disconnecting a Power Cable with an Installed Cable Retaining Bracket" on page 132.

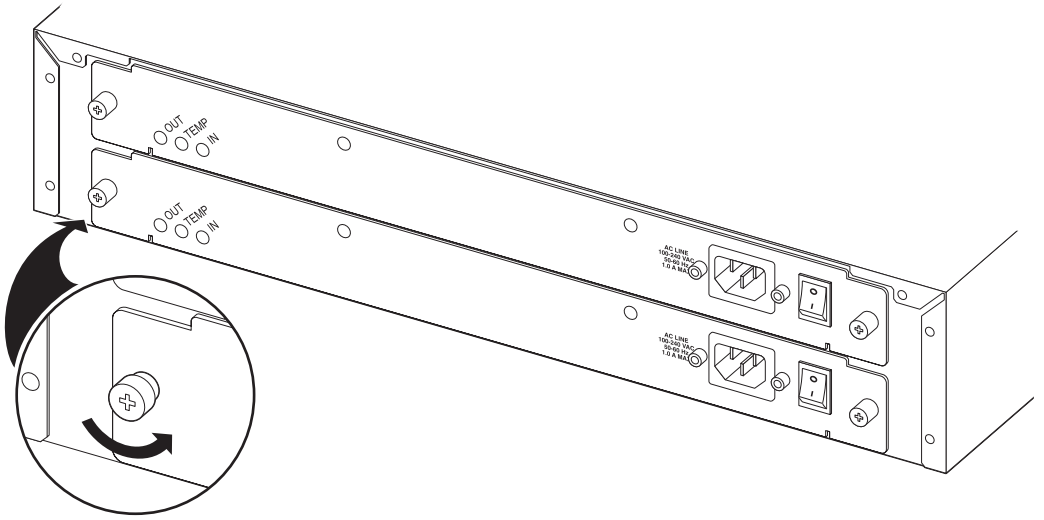
4 Disconnect the power cable from the power supply.

CAUTION

Shock Hazard.

5 Use a #2 Phillips screwdriver to unscrew the two captive retaining screws. See the detail in Figure 61.

Figure 61: Captive retaining screws on the Summit 300-48t power supply

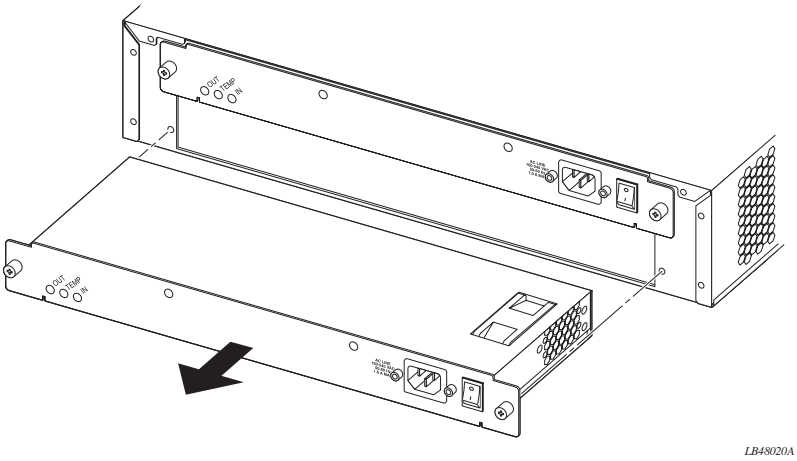


6 Hold the retaining screws, and use them to slowly pull the power supply toward you, as shown in Figure 62.

WARNING!

Do not insert your fingers or hands into the empty power supply bay.

Figure 62: Removing the Summit 300-48 power supply



7 If you are not going to install a replacement power supply, cover the power supply bay with the blank cover plate that was originally supplied with the switch.

If you are replacing a power supply, follow the installation instructions in "Installing an Internal 600-Watt Power Supply" on page 122.

Installing an External Power System for a Summit 400 Switch

The Extreme External Power System (EPS) allows you to add a redundant power supply to the Summit 400 switch to protect against a power supply failure. It consists of a tray (EPS-T) that holds one or two EPS-160 power supplies. Each EPS-160 provides one-to-one redundancy to an attached Extreme switch. Check the Extreme Networks website or contact your local sales representative for a list of compatible Extreme Networks switches.

The external power system can be ordered with one or two EPS-160 power supplies. The EPS-160 installs into an existing EPS-T rack-mountable chassis. You can order an additional EPS-160 to add to an installed system. If you do not already have an EPS-T, you can order one from your sales representative. Each EPS-160 ships with a special redundant power supply cable.

The EPS-T can be mounted in a rack or placed free-standing on a tabletop.

NOTE

The EPS-T and EPS-160 are not compatible with the Summit 400-24p switch.

CAUTION

Only trained service personnel should install or remove the Extreme External Power System, in accordance with the installation instructions. Before servicing this system, please read the safety information provided in Appendix A. Not following these precautions can result in equipment damage or shock.

Rack Mounting the EPS-T

CAUTION

Do not use the rack mount kits to suspend the EPS-T from under a table or desk, or to attach the EPS-T to a wall.

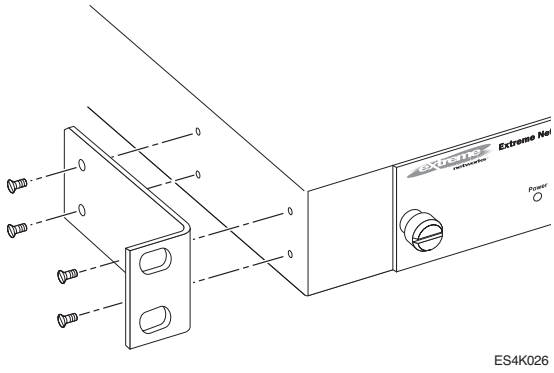
WARNING!

The EPS-160, the EPS-T, and rack must be connected to protective earth ground before attaching to another switch.

To rack mount the EPS-T:

1. Place the EPS-T upright on a hard flat surface, with the front facing you.
2. Remove the mounting bracket kit (including screws) from the packaging.
3. Locate a mounting bracket over the mounting holes on one side of the unit.
4. Insert the screws and fully tighten with a suitable screwdriver, as shown in Figure 63.

Figure 63: Fitting the mounting bracket



5. Repeat steps 3 and 4 for the other side of the EPS-T.
6. Insert the EPS-T into a 19-inch rack and secure it to the rack with appropriate screws.

CAUTION

Do not attach the AC power cord to the EPS-160 until it is properly mounted in the EPS-T (that is properly grounded) and after the redundant power supply cable is connected.

7. Connect the keyed end of the redundant power supply cable to the EPS-160. The key is a plastic tab on the cable connector housing that fits into the chassis to ensure correct alignment of the connector. See Figure 64 for details on the connector key and Figure 65 to locate the connectors on the EPS-160 and the switch. For wire-to-pin connections for the connector on the rear panel of the EPS-160, see "Power Connector Specifications" on page 337.

NOTE

The cable length is 1 meter.

Figure 64: Redundant Power Cable with Key

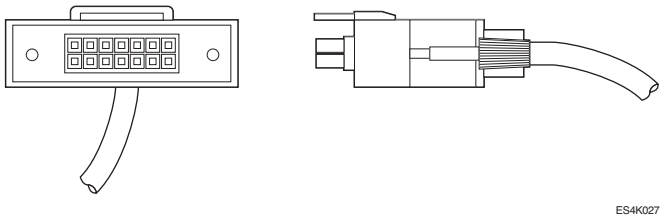
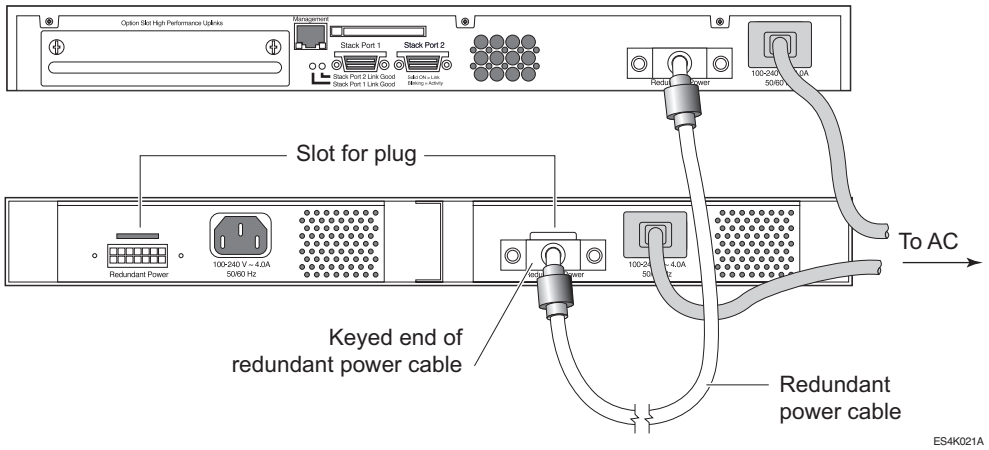


Figure 65: Redundant Power Connection



8 Connect the other end of each EPS-160 power supply cable to the Extreme switch. This connector end can only be inserted into the switch with the end marked TOP facing up.

9 Connect the supplied AC cable to the AC supply for each unit.

For countries other than the USA, you might require a different AC cable that is not supplied. Contact your sales representative for the appropriate cable type and for information regarding the voltage and current requirements of the power supply.

Adding a Second EPS-160 to the EPS-T

To install an individual EPS-160 in the EPS-T:

1 Remove the EPS-160 from the packing material.

2 Insert the EPS-160 into the front of the EPS-T.

3 Tighten the provided thumbscrews to secure the power supply to the tray.

4 Follows steps 7 through 9 on page 125.

Removing an EPS-160 from the EPS-T

To remove an EPS-160 from an EPS-T:

1 Disconnect the AC by removing the plug from the wall

2 Disconnect the AC power cord from the EPS-160.

3 Remove the redundant power cable from the EPS-160.

4 Loosen the thumbscrews on the front of the tray and slide the EPS out of the EPS-T.

Installing and Removing Summit48si AC Power Supplies

This section applies only to the Summit48si switch AC power supplies. The Summit48si comes with a minimum of one power supply preinstalled at the factory. If you have a Summit48si switch, follow the instructions in this section for removing and installing the Summit48si AC power supplies.

For information about removing and installing Summit48si DC power supplies, see "Installing the Summit48si Switch DC Power Supply" on page 132.

NOTE

Only trained service personnel should install or remove Summit48si power supplies.

NOTE

If you need to power down the switch, remove all the power cords from the installed power supplies.

Power Supply Cords

An AC power cord is not included with the Summit48si power supply. To purchase an AC power cord, contact your local Extreme Networks Channel Account Manager or Sales Manager, or purchase a cord from your local supplier.

All power supply cords must meet the following requirements:

- The power cord must be agency-certified for the country of use and rated for 100-240 V AC.
- The power cord must have an IEC 320 C13 connector for connection to the power supply.
- The power cord must have an appropriately rated and approved wall plug applicable to the country of installation.
- For cords up to 6 feet (2 m) long, the wire size must be 18 AWG (.75 mm2) minimum; over 6 feet, the minimum wire size is 16 AWG (1.0 mm2).

Installing a Summit 48si AC Power Supply

To install a Summit48si AC power supply:

1 Remove the blank faceplate from the power supply bay.

2 Use the handle to slide the power supply into the bay.

3 Align and tighten the two captive retaining screws using a #2 Phillips screwdriver.

4 To turn the power supply on, connect the AC power cable to the power supply and then to the wall outlet.

WARNING!

Do not plug in the power cable into the power supply unless the power supply is installed in the switch.

5 Keep the faceplate and the power supply packaging for future use.

Removing a Summit 48si AC Power Supply

To remove a Summit48si AC power supply:

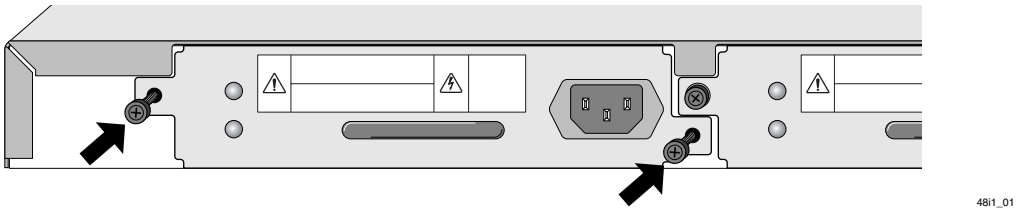
1 Remove the power cable from the wall outlet and then from the switch.

CAUTION

Shock hazard.

2 Use a #2 Phillips screwdriver to unscrew the two retaining screws, as shown in Figure 66.

Figure 66: Removing the retaining screws from the Summit48si AC power supply

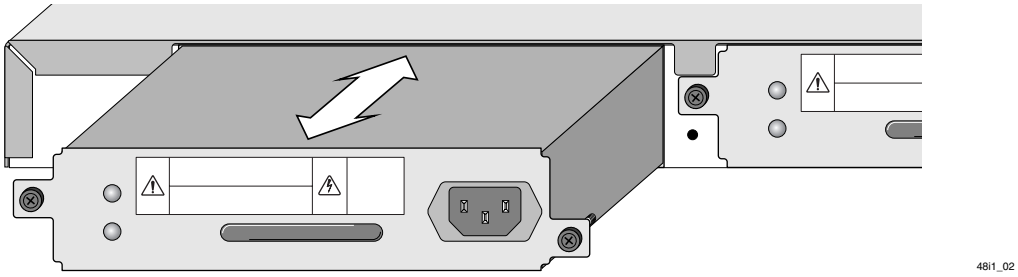


3 Use the handle to slowly pull the power supply toward you, as shown in Figure 67.

WARNING!

Do not insert your fingers or hands into the empty power supply bay.

Figure 67: Removing the Summit48si AC power supply



4 If you are not going to install a replacement power supply, cover the power supply bay with the blank faceplate that was originally supplied with the switch.

Otherwise, follow the instructions in “Installing a Summit 48si AC Power Supply” on page 127to install a new power supply.

Installing the AC Power Cable Retaining Bracket

The AC power cables for Summit switches can be attached to the power supply using power cable retaining brackets. The retaining brackets make it less likely that a power supply cable will be inadvertently knocked loose from a power supply.

To install a power cable retaining bracket:

1. On a Summit switch with a power switch, turn off the power supply by setting the power switch to the OFF position.
2. Disconnect the power cable from the power source and then from the Summit switch.
3. If necessary (for example, on a Summit 1i or Summit 5i), remove the two retaining screws from the power socket on the rear of the switch using a #2 Phillips screwdriver.

   Keep the screws for future use.
4. Slide the retaining bracket over the power cable, as shown in Figure 68 or Figure 70.

   If necessary, loosen the retaining bracket screw.
5. Connect the power cable to the switch

CAUTION

Do not connect the power cable to the power source at this time.

Figure 68: Attaching the retaining bracket directly

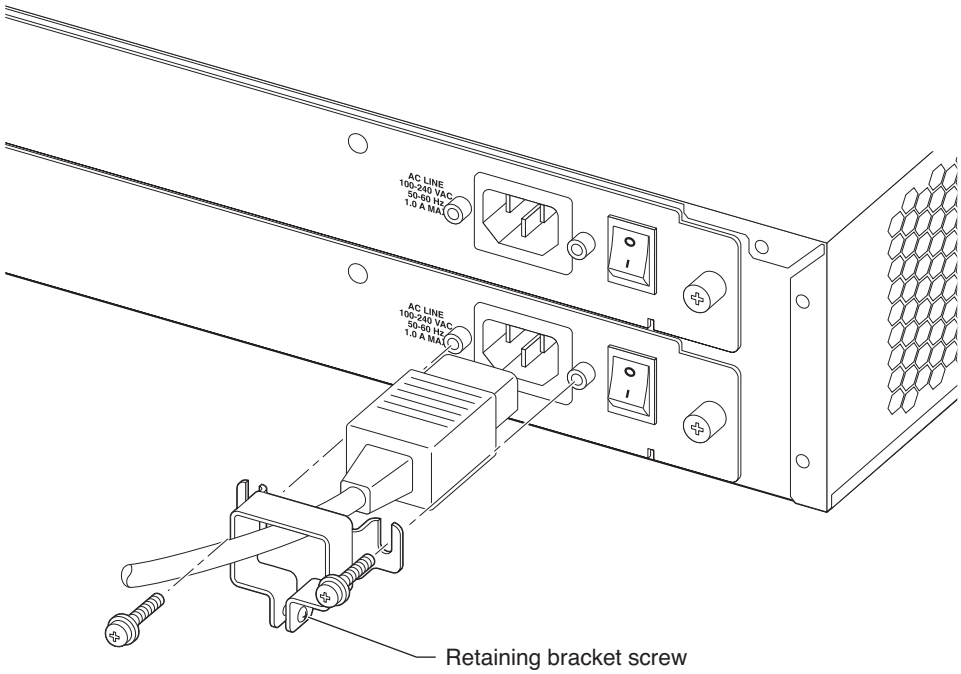


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Figure 69: Attaching the retaining bracket using spacers

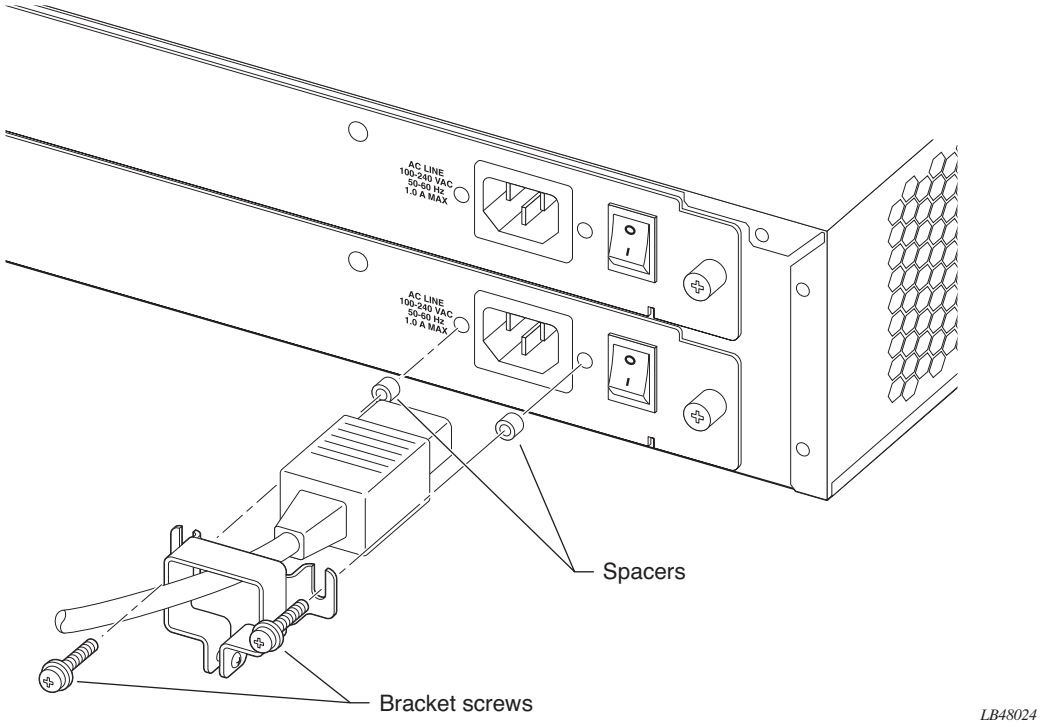
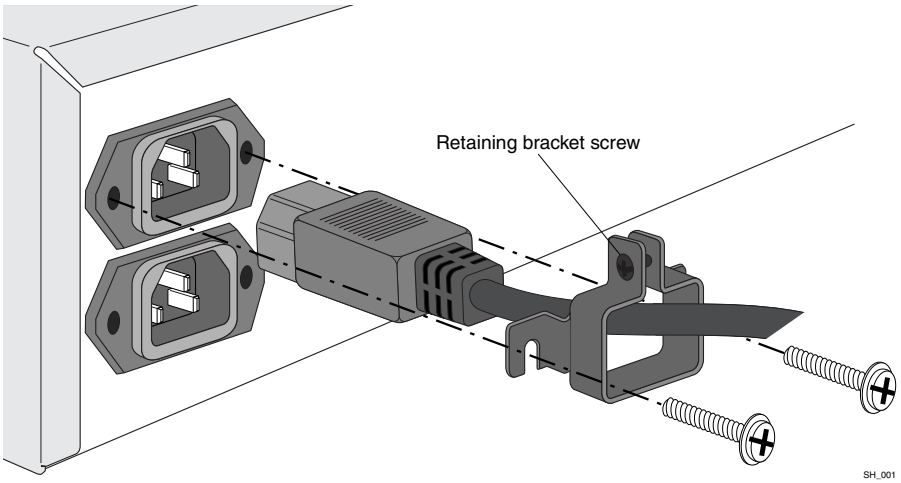


Figure 70: Attaching the retaining bracket to the power socket



6 Attach the retaining bracket to the power supply in one of the following ways:

- If you removed retaining screws from the power socket, use those screws to attach the
- For power supplies with permanently attached standoffs, attach the retaining bracket to the power supply using the bracket screws, as shown in Figure 68.
- For power supplies without permanently attached standoffs, use the supplied spacers between the bracket and the power supply, as shown in Figure 69.

If your switch has two power supplies, align the retaining brackets so that the retaining bracket screws do not interfere with each other. Figure 71 and Figure 72 show typical bracket orientations.

Figure 71: Attaching two retaining brackets—first example

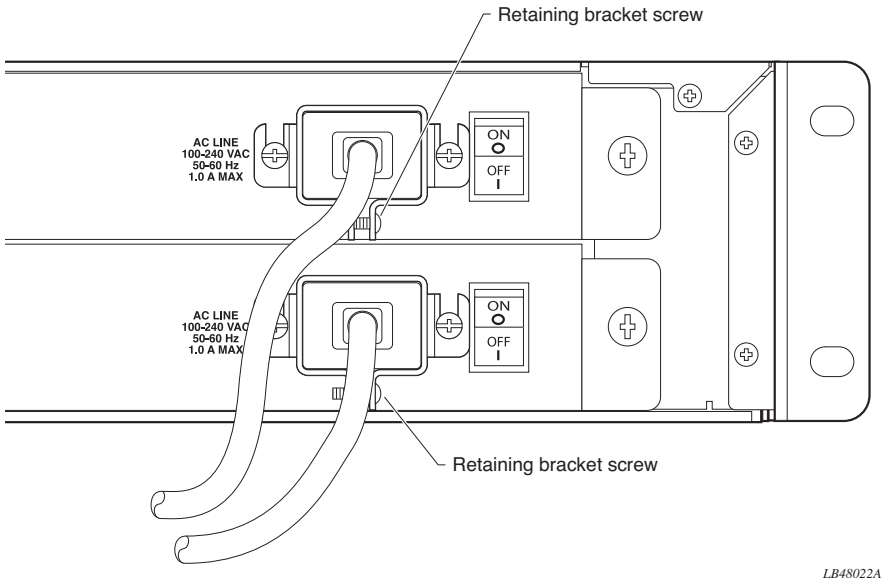
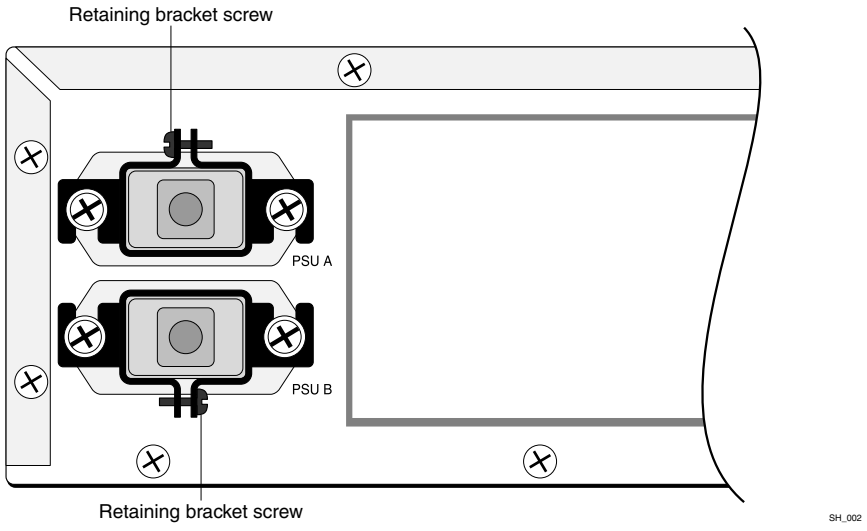


Figure 72: Attaching two retaining brackets—second example



7 Tighten the retaining bracket screw to secure the bracket around the power connector.

8 Connect the power cable to the power source.

9 If the switch has a power switch, set the power switch to the ON position.

Disconnecting a Power Cable with an Installed Cable Retaining Bracket

If a power cable retaining bracket is installed, you must loosen the retaining bracket from the cable before you can disconnect the power cable.

To disconnect a power cable when a cable retaining bracket is installed:

1. On a Summit switch with a power switch, turn off the power supply by setting the power switch to the OFF position.
2. Disconnect the power cable from the power source.
3. Loosen the retaining bracket screw to allow the power connector to slide out of the bracket (see Figure 71).
4. Disconnect the power cable from the power supply.

If you are installing a replacement power cable, tighten the power cable retaining bracket around the new cable (see Figure 71).

If you are installing a replacement power supply, follow the instructions in "Installing and Removing the Internal 600 Watt AC Power Supply (15412)" on page 121 or "Installing and Removing Summit48si AC Power Supplies" on page 127. After you install the replacement power supply, install a power cable retaining bracket as described in "Installing the AC Power Cable Retaining Bracket" on page 129.

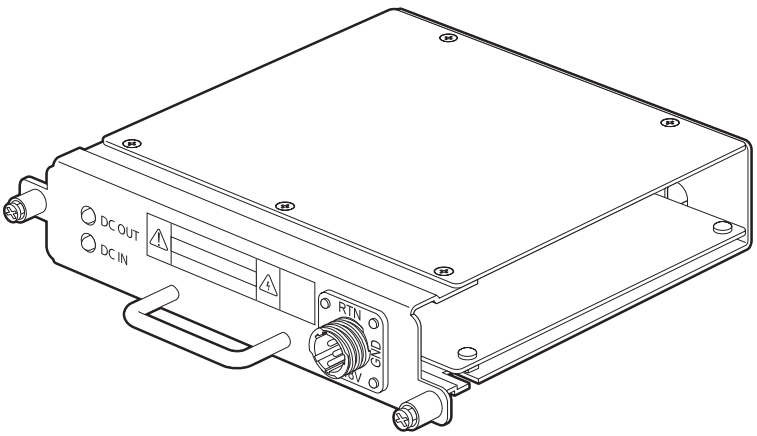
Installing the Summit48si Switch DC Power Supply

The Summit48si switch comes with one DC power supply that is preinstalled at the factory. You can add a second power supply for redundancy.

This section describes the steps to install the Summit38si DC power supply.

Figure 73 shows the Summit48si DC power supply.

Figure 73: Summit48si DC power supply



The Summit48si DC power supplies slide in from the rear of the switch. The front of the power supply provides a handle for inserting and removing the power supply from the chassis.

DC input power is provided through a three-pin connector on the front panel.

Before installing or removing a Summit48si DC power supply, read the following warnings.

WARNING!

Before you can attach the keyed connector to the DC power supply, the wiring harness (supplied) must be hard-wired to the DC source by a qualified, licensed electrician.

WARNING!

The Summit48si switch and rack must be connected to protective earth ground before installing any switch components.

CAUTION

If you are replacing a DC power supply, disconnect the keyed DC connector from the power supply before removing it from the switch to prevent damage to the DC power supply output connector.

NOTE

For centralized DC power connection, this product is intended to be installed in Restricted Access Areas (Dedicated Equipment Rooms, Equipment Closets, or the like) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

You need the following tools and equipment to install a Summit48si switch DC power supply:

- ESD-preventive wrist strap
- # 2 Phillips screwdriver

To install the Summit48si DC power supply:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top-right corner of the switch front panel.
2. If there is a blank faceplate covering the power supply bay, remove it and save it for future use.
3. Ensure that the power supply is right side up.

   NOTE

   When you insert a power supply, use one hand to support the power supply from the bottom and the other hand to hold the central handle on the front of the power supply.

4. Use the central handle to guide the power supply into the bay while supporting the supply from the bottom with your other hand.

   CAUTION

   Do not slam the power supply into the backplane. This or other excessive force will cause damage and possibly require the return of the switch.

5 Place both hands on each side of the power supply to slowly and evenly slide the power supply into the bay.

6 Secure the power supply by tightening the screw on either side of the front panel by using a #2 Phillips screwdriver.

7 Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

To install an additional power supply, repeat steps 1 through 7.

Preparing and Attaching the DC Power Supply Cable

After you install the power supply in the chassis, you must attach the keyed connector to provide power to the switch.

NOTE

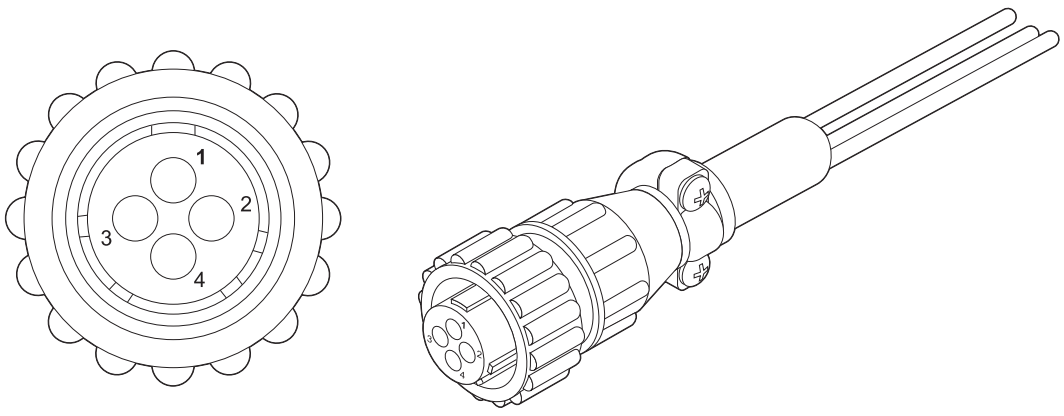
Do not connect the DC power source cable to the DC power supply until installation is complete.

A three-wire DC wiring harness is included with the Summit48si switch and DC power supply. You must connect the harness to the DC source voltage at your facility before you connect the keyed connector to the DC power supply. You should provide proper connection and strain relief on this cable in accordance with all local and national electrical codes.

WARNING!

Wiring the DC input power harness to your facility DC source voltage must be performed by a qualified, licensed electrician. After the wiring harness is connected to a permanent DC voltage source by a qualified, licensed electrician, you can remove, replace and maintain the Summit48si system without further electrician assistance.

Figure 74: Three-wire Cable Harness



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For the wire-to-pin connection specifications, see “Wire-to-pin connection specifications for the Summit 48si DC power cable” on page 337.

NOTE

Each wire on the harness has been properly marked for proper attachment to the DC power source. Leave these labels on each lead wire for future reference.

Attaching the Connector to the DC Power Supply

DC input power is provided through a three-pin connector on the front panel of the DC power supply.

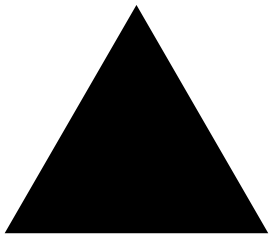
To attach the cable to the Summit48si DC power supply:

1. Plug the three-wire cable harness onto the connector on the front of the power supply.

   The pins must align properly for the cable to completely connect. Do not force the cable onto the connector until the keyway is aligned properly.
2. Tighten the retainer nut on the connector until it is finger tight.
3. Secure the tray cable near the rack framework using multiple cable ties to minimize the chance of the connections being disturbed by casual contact with wiring. Use at least four cable ties separated 4 inches apart with the first one located within 6 inches of the terminal block.

NOTE

It is not necessary to switch off power from the source when removing the keyed connector from the Summit48si DC power supply.



Part 4
Alpine Switch

6 Alpine 3800 Series Switch Models

The Alpine 3800 series switch is a chassis-based, Ethernet service provisioning switch designed for edge and aggregation applications. The Alpine 3800 series switch is flexible and scalable, making it easy for you to meet the changing requirements of your network.

There are three models in the Alpine 3800 series: the Alpine 3808 switch, the Alpine 3804 switch, and the Alpine 3802 switch.

This chapter includes the following topics:

- Features on page 139
- Alpine 3808 Switch on page 142
- Alpine 3804 Switch on page 144
- Alpine 3802 Switch on page 146

Features

This section describes the features of the Alpine family of switches. If the information in the release notes differs from the information in this guide, follow the release notes. For more information about configuring the switch, refer to the *ExtremeWare Software User Guide* and *The ExtremeWare Command Reference Guide*.

The features of the Alpine 3800 series switch include:

- A chassis that can be populated with various I/O modules and one Switch Management Module.

  The Switch Management Module in the Alpine 3803 or 3804 is hot-swappable and user removable, but the Alpine 3802 has an integrated management module that is not hot-swappable or user removable. For specific details of each chassis, see the individual switch descriptions.
- Hot-swappable I/O modules that include Gigabit Ethernet or 10/100 Mbps Ethernet ports
- Redundant, load-sharing, hot-swappable power supplies (Alpine 3808 and Alpine 3804)
- Field-replaceable, hot-swappable fan tray (Alpine 3808 and Alpine 3804)
- Fully non-blocking operation; all ports transmit and receive packets at wire speed. (Select high density Gigabit modules are oversubscribed.)
- Autonegotiation for half-duplex or full-duplex operation on 10/100 Mbps ports
- Load-sharing on multiple ports

- Console (RS-232) port for accessing the CLI
- Dedicated 10BASE-T/100BASE-TX port for out-of-band management using CLI, ExtremeWare Vista, or SNMP

Port Connections

The Alpine 3800 series switches support different port configurations on the different Alpine I/O modules, as described in Table 24.

CAUTION

Modules that use SX, LX, and LX70 interfaces contain Class 1 laser devices. Invisible laser radiation can occur when open. Avoid direct eye exposure to the beam.

Table 24: Port configurations available on Alpine I/O modules

Ethernet Ports						
Module	**10BASE-T/ 100BASE-TX**	**100BASE-TX/ 1000BASE-T**	**GBIC**	**1000BASE-SX**	**100BASE-FX**	**OTHER**
GM-4Ti		4				
GM-4Xi			4[1]			
GM-4Si				4		
GM-16X[3]						16 Mini-GBIC[3]
GM-16T[3]	16[4]					
FM-32Ti	32					
FM-24Ti	24					
FM-24SFi					24	
FM-24MFi					24	
FM-8Vi						8 VDSL[5]
WM-4T1i	2					4 T1
WM-4E1i	2					4 E1
WM-1T3i	2					1 T3

1 The GM-4Xi supports 1000BASE-SX, 1000BASE-LX, and 1000BASE-LX70.
3 The GM-16X[3] supports 1000BASE-X.
4 The GM-16T[3] supports 10/100/1000BASE-T autonegotiation.
5 The FM-8Vi has eight internal loopback ports for rate shaping. Module supports 10BASE-S.

Power Supplies

The Alpine 3800 series switch supports the following types of power supplies:

- AC —Auto-sense for 110 and 220 VAC power
- DC—Requires -48 VDC nominal input line voltage

If two power supplies are installed in the switch, both installed power supplies must be of the same type.

The AC power supplies auto-sense for 110 VAC and 220 VAC power. The DC power supplies require -48 V DC nominal input line voltage. When two power supplies are present, the power is load-shared between the supplies for enhanced longevity.

AC Power Supply Cords

An AC power cord is not included with the Alpine AC power supply. To purchase an AC power cord, contact your local Extreme Networks Channel Account Manager or Sales Manager, or purchase a cord from your local supplier. All power supply cords must meet the requirements listed in "Power Cable" on page 310.

The Alpine 3800 series switch supports the power supply configurations listed in Table 25.

Table 25: Supported power supplies for the Alpine 3800 series switch

Switch Model	AC power supply	DC power supply	Hot-swappable
Alpine 3808[1]	Up to two AC power supplies can be installed.	Up to two DC power supplies can be installed.	Yes
Alpine 3804[1]	Up to two AC power supplies can be installed.	Up to two DC power supplies can be installed.	Yes
Alpine 3802[1]	Up to two AC power supplies can be installed.[2]	Two DC power supplies must be installed.[3]	No

1 All installation, maintenance, and removal of a power supply must be done by qualified, trained service personnel only.
2 If you have one AC power supply installed in the Alpine 3802 switch, it must be installed in the lower power supply tray (PSU A).
3 If you require DC power supplies in the Alpine 3802 switch, you must have two DC power supplies installed.

The Alpine 3800 series switch generates SNMP traps for the following events:

- AC power source fails
- Power supply fails
- Power supply is removed

For more information about planning your site and power requirements, see "Meeting Power Requirements" in Chapter 2. For more information about the specifications of the Alpine 3800 series switch power supplies, see Table 82 on page 331.

Power Supply LEDs

Table 26 and Table 28 describe LEDs that pertain to power for the Alpine 3800 series switch.

Table 26: Alpine 3808 and Alpine 3804 power supply LED

LED	Color	Indicates
D/C OK	Green	All DC outputs are operational
	Off	One or more DC outputs have failed

Table 27: Alpine 3802 power supply LED

LED	Color	Indicates
PSU A, PSU B	Green	Normal operation
	Amber	DC output failure
	Off	PSU not present or not powered

Fans

The Alpine 3808 and 3804 switches have hot-swappable fan trays. The Alpine 3802 has built-in fans that are not designed to be replaced by customers.

ExtremeWare monitors the fan trays in the Alpine 3800 series switches for failure and overheat conditions. All fan failures and over temperature events cause the switch to send alerts to the network management station or to the switch log. See the *ExtremeWare Software User Guide* for more information about switch monitoring.

CAUTION

Do not cover or obstruct the fan ventilation holes at the rear of the unit. Doing so can result in overheating and possible damage to the Alpine switch. Thermal sensors will shut down the Alpine switch if the internal temperature exceeds 60 degrees Celsius.

Alpine 3808 Switch

The Alpine 3808 switch consists of the following components:

- One 9-slot chassis, 12 U high, with backplane
- Eight I/O module slots, labeled 1 through 8
- One Switch management Module (SMMi) slot
- One or two power supplies, accessed from the front of the unit
- One hot-swappable fan tray containing five fan units, accessed from the front of the unit
- One connector for an electrostatic discharge (ESD) wrist strap

The Alpine 3808 switch can support up to the following number of ports and types of port configurations:

- 256 switched 10BASE-T/100BASE-TX Ethernet ports
- 192 switched 100BASE-FX Fast Ethernet ports
- 32 switched Gigabit Ethernet ports
- 128 switched 1000BASE-X oversubscribed ports
- 128 switched 10/100/1000BASE-T oversubscribed ports
- 32 switched T1 ports
- 32 switched E1 ports
- 48 switched Ethernet over VDSL ports
- 8 switched T3 ports

Figure 75 shows the Alpine 3808 chassis populated with one required SMMi and eight I/O modules.

Figure 75: Front view of the Alpine 3808 switch with typical I/O modules installed

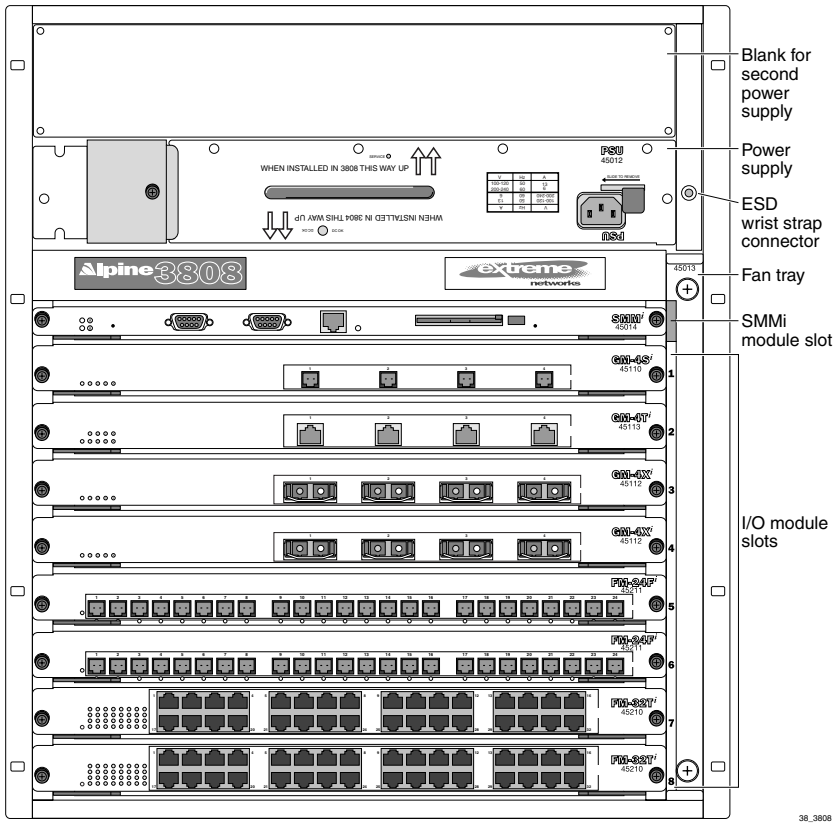
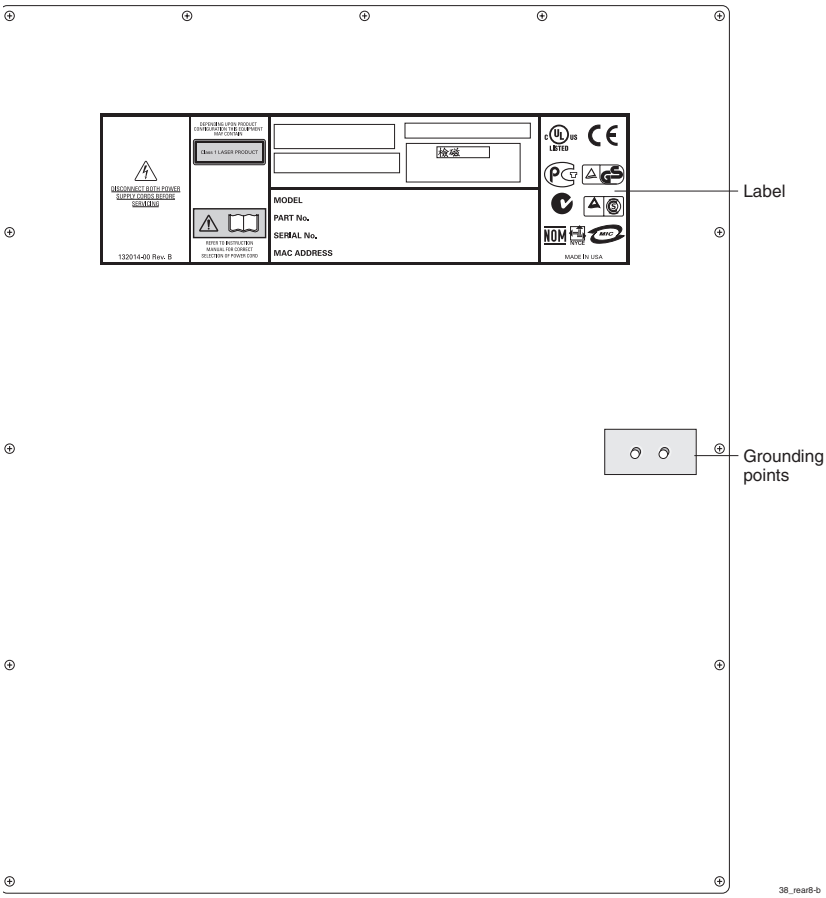


Figure 76 shows the rear panel of the Alpine 3808 switch.

Figure 76: Rear panel of the Alpine 3808 switch



The rear panel of the Alpine 3808 switch provides:

- Chassis grounding points
- System label, which includes:
  - — Chassis serial number
  - — Ethernet MAC address of the switch
  - — Symbols of safety certification

Alpine 3804 Switch

The Alpine 3804 switch consists of the following components:

- One 5-slot chassis, 6 U high, with backplane
- Four I/O module slots, labeled slots 1 through 4
- One SMMi slot
- One or two power supplies, accessed from the rear of the unit
- One hot-swappable fan tray containing three fan units, accessible from the front of the switch
- One electrostatic discharge (ESD) wrist strap connector

The Alpine 3804 switch can support up to the following number of ports and types of port configurations:

- 128 switched 10BASE-T/100BASE-TX Ethernet ports
- 96 switched 100BASE-FX Fast Ethernet ports
- 16 switched Gigabit Ethernet ports
- 64 switched 1000BASE-X oversubscribed ports
- 64 switched 10/100/1000BASE-T oversubscribed ports
- 16 switched T1 ports
- 16 switched E1 ports
- 32 switched Ethernet over VDSL ports
- 4 switched T3 ports

Figure 77 shows the Alpine 3804 chassis populated with one required SMMi and five I/O modules.

Figure 77: Front view of the Alpine 3804 switch with typical I/O modules installed

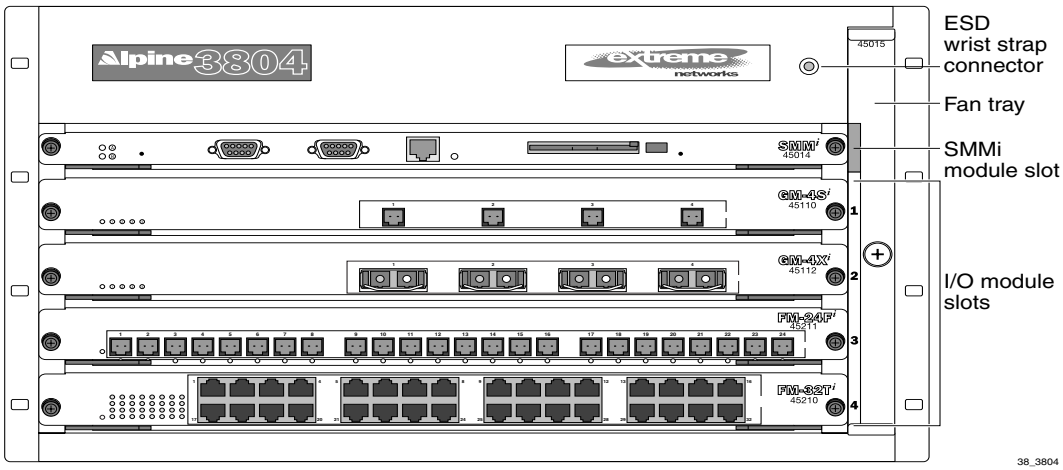
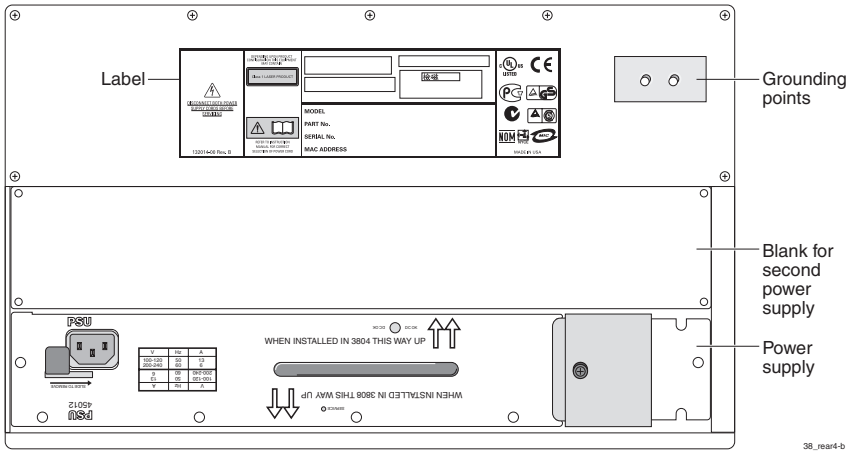


Figure 78 shows the rear panel of the Alpine 3804 switch.

Figure 78: Rear panel of the Alpine 3804 switch



The rear panel of the Alpine 3804 switch provides:

- Access to the power supply
- Chassis grounding points
- System label, which includes:
  - — Chassis serial number
  - — Ethernet MAC address of the switch
  - — Symbols of safety certification

Alpine 3802 Switch

The Alpine 3802 switch consists of the following components:

- One 3-slot chassis, 4 U high, with backplane
- Three I/O module slots, labeled slots 1 through 3
- One integrated management module
- One or two preinstalled power supplies, either AC or DC
- One built-in fan tray containing three fan units; this fan tray is not customer-serviceable.
- One connector for an electrostatic discharge (ESD) wrist strap
- Six light emitting diodes (LEDs)

CAUTION

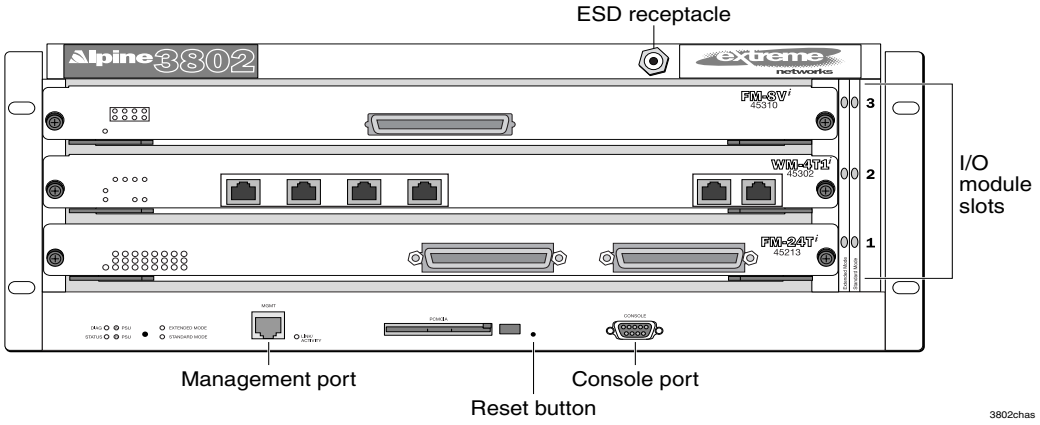
The Alpine 3802 switch has an integrated Switch Management Module (SMMi). The integrated Switch Management Module is not hot-swappable or user removable. Do not attempt to remove the integrated Switch Management Module. Contact Extreme Networks Customer Support if you experience problems.

The Alpine 3802 switch can support up to the following number of ports and types of port configurations:

- 64 switched 10BASE-T/100BASE-TX Ethernet ports
- 48 switched 100BASE-FX Fast Ethernet ports
- 8 switched Gigabit Ethernet ports
- 16 switched 1000BASE-X oversubscribed ports
- 16 switched 10/100/1000BASE-T oversubscribed ports
- 12 switched T1 ports
- 12 switched E1 ports
- 16 switched Ethernet over VDSL ports
- 3 switched T3 ports

Figure 79 shows the Alpine 3802 chassis populated with three I/O modules.

Figure 79: Front view of the Alpine 3802 switch with typical I/O modules installed



The Alpine 3802 switch provides up to 16 Gigabits of full-duplex bandwidth and supports all existing Alpine Ethernet I/O modules (I/O modules with the green stripe), including the Alpine Access I/O modules (I/O modules with the silver stripe). For more information about the Alpine I/O modules, see Chapter 10.

The Alpine 3802 switch operates in three modes:

- Extended—All slots (slots 1, 2, and 3) are enabled. Slot 1 supports all existing Alpine modules: Alpine Ethernet I/O modules (green stripe) and Alpine Access I/O modules (silver stripe). Slots 2 and 3 support only Alpine Access I/O modules (silver stripe).
- Standard—Only slots 1 and 2 are enabled. Slot 3 is disabled. Slots 1 and 2 support all existing Alpine modules: Alpine Ethernet I/O modules (green stripe) and Alpine Access I/O modules (silver stripe).
- Auto—The switch determines if it is in standard or extended mode depending on the type of modules installed in the chassis or the slot preconfigurations.

To configure the switch to operate in a specific mode, use the command:

```
configure switch {auto | extended | standard}
```

By default, the switch operates in auto mode.

NOTE

Slot 3 in the Alpine 3802 accepts only Alpine Access I/O modules (silver stripe). You cannot insert an Alpine Ethernet I/O module (green stripe) into slot 3.

For more information about this command, see the *ExtremeWare Command Reference Guide* and the *ExtremeWare Software User Guide*.

Alpine 3802 Switch LEDs

The Alpine 3802 switch has an integrated switch management module with LEDs to indicate switch operating status. Table 28 describes the LED activity of the Alpine 3802 switch.

Table 28: Alpine 3802 switch LEDs

LED	Color	Indicates
DIAG	Green blinking	Power-on Self Test (POST) is running
	Off	Normal operation
STATUS	Green blinking	Normal operation
	Yellow blinking	Critical error, fan failure, or over temperature
	Off	Unit is not receiving power
PSU A, PSU B	Green	Normal operation
	Amber	PSU failure
	Off	PSU not present or not powered
EXTENDED MODE	Green	Extended mode operation
	Off	Not operating in extended mode
STANDARD MODE	Green	Standard mode operation
	Off	Not operating in standard mode

NOTE

The Alpine 3802 switch has an integrated Switch Management Module in the chassis.The module is not hot-swappable or user-removable. Do not attempt to remove. Contact Extreme Networks Customer Support if you experience problems.

Alpine 3802 Power Versions

The Alpine 3802 switch comes in two versions, AC and DC. Each installed power supply has its own power connection socket (AC) or input terminal block and power switch (DC). When two power supplies are installed and powered on, they provide a redundant, load-shared power supply to the Alpine 3802 switch. If one of the power supplies fails, the second power supply provides all power and ensures uninterrupted network operation.

The Alpine 3802 AC switch can support either one or two factory-installed power supplies. If you require DC power, the Alpine 3802 switch must have two factory-installed DC power supplies.

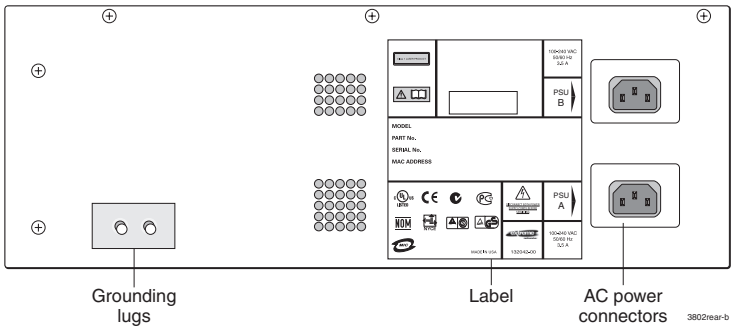
Connect each power supply to different, independent power sources. If a power source fails, it will affect only the power supply to which it is connected. If all switch power supplies are connected to a single power source, the entire switch is vulnerable to a power source failure.

NOTE

Do not attempt to repair a failed power supply; power supplies are not user-removable. Alpine 3802 switch power supplies must be installed or removed only by trained service personnel. Contact Extreme Networks Customer Support if you experience problems.

Figure 80 shows the rear panel of the Alpine 3802 switch with AC power supplies installed

Figure 80: Rear panel of the Alpine 3802 switch with dual AC power supplies

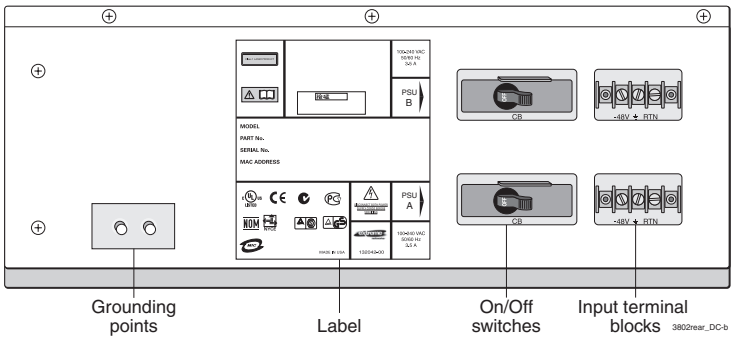


The rear panel of the Alpine 3802 AC switch provides:

- Chassis grounding lugs
- System label, which includes:
  - — Chassis serial number
  - — Ethernet MAC address of the switch
  - — Symbols of safety certification
- One or two AC power sockets

Figure 81 shows the rear panel of the Alpine 3802 switch with DC power supplies installed

Figure 81: Rear panel of the Alpine 3802 switch with dual DC power supplies

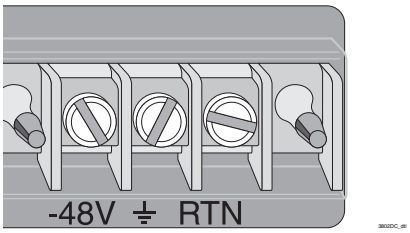


The rear panel of the Alpine 3802 DC switch provides:

- Chassis grounding points
- System label that includes:
  - — Chassis serial number
  - — Ethernet MAC address of the switch
  - — Symbols of safety certification
- On/Off switches
- Input terminal blocks

Figure 82 shows a close-up of the Alpine 3802 DC connector

Figure 82: DC connector on the Alpine 3802 DC switch



For centralized DC power connections, install only in a restricted access area.

7 Alpine 3800 Series Chassis Installation

This chapter includes the following topics:

- Installation Summary on page 151
- Safety Information on page 151
- Installing the Chassis in a Rack on page 152
- Grounding the Alpine 3800 Series Chassis on page 155
- Removing the Chassis on page 157

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove any Alpine chassis.

Installation Summary

Installing an Alpine 3800 series switch includes the following tasks:

- Install the chassis in a rack (see page 152).
- Ground the chassis (see page 155).
- Install power supplies and connect power (see Chapter 8).
- Install modules (see Chapter 9 and Chapter 10).

Safety Information

WARNING!

Read the safety information in Appendix A thoroughly before installing your Extreme Networks switch. Failure to follow this safety information can lead to personal injury or damage to the equipment.

- Only trained service personnel should perform service to components of an Alpine 3800 series switch. Trained service personnel have appropriate technical training and experience necessary to be

aware of the hazards to which they are exposed in performing a task. They are aware of measures to minimize the danger to themselves or other persons.

NOTE

Electronic components are sensitive to static electricity. ESD originating from you or from objects around you can damage these components. Exercise every possible precaution to prevent ESD when working around printed circuit assemblies.

Keep all printed circuit assemblies in protective ESD-preventive packaging or place them on antistatic mats until you are ready to install them. Wear an ESD-preventive wrist strap and ensure that the leash is securely grounded before handling a bare printed circuit assembly.

- Some devices, such as I/O modules, contain fiber optic ports. To protect your eyes, you should never look at the fiber optic ports while they are on, or look directly at the fiber cable ends when they are on.

Installing the Chassis in a Rack

The Alpine 3800 series chassis fits in a standard 19-inch (48.26 cm) rack. Table 29 shows the height measurements for the Alpine 3800 series chassis.

Table 29: Alpine 3800 chassis height measurements

Switch Model	Height
Alpine 3808	12 U
Alpine 3804	6 U
Alpine 3802	4 U

The Alpine 3808 and Alpine 3804 chassis are shipped with preinstalled fan trays. The Alpine 3802 chassis is shipped with a preinstalled power supply and fan tray. For your safety and to prevent damage to the equipment, Extreme Networks strongly recommends that you mount the chassis in the rack as shipped, before you install modules and power supplies. The increased weight of the chassis after components are installed can make the switch hard to maneuver.

NOTE

Mount the chassis in a rack before installing any switch components.

To mount the Alpine 3800 series chassis in a standard 19-inch (48.26 cm) rack, you need the following tools, equipment, and resources:

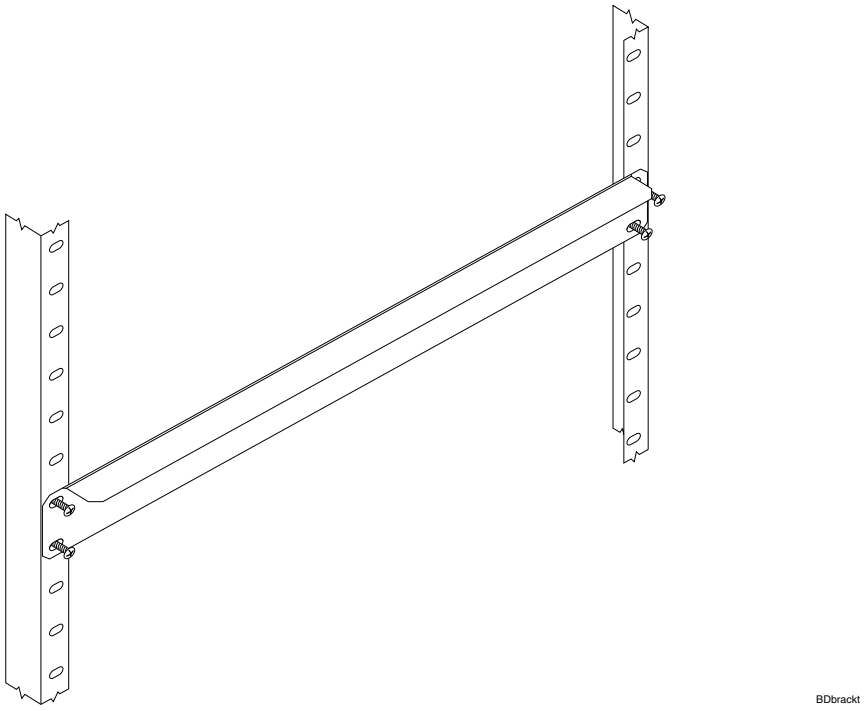
- Helper bracket (provided)
- A minimum of four appropriate screws (not provided) to secure the helper bracket
- For an Alpine 3808 or 3804, a minimum of eight appropriate screws (not provided) to secure the chassis to the rack
- For an Alpine 3802, a minimum of four appropriate screws (not provided) to secure the chassis to the rack

- # 1 Phillips screwdriver
- A minimum of two people to help install the chassis in the rack

To mount the chassis in a rack:

1 Attach the helper bracket in the lowest available position in the rack using four appropriate screws (not provided), as shown in Figure 83.

Figure 83: Helper bracket for installing the Alpine 3800 series chassis



2 Place the box containing the chassis upright on a secure flat surface with the front of the box facing you.

3 Remove the chassis from the box, and remove the packing material from the chassis.

4 Have a minimum of two people lift and place the empty chassis on the helper bracket and slowly guide the chassis into the rack.

5 While holding the empty chassis, secure it with four or eight suitable screws, depending on the model.

- Alpine 3808—eight screws (Figure 84)
- Alpine 3804—eight screws (Figure 85)
- Alpine 3802—four screws (Figure 86)

Figure 84: Alpine 3808 chassis with eight mounting screws

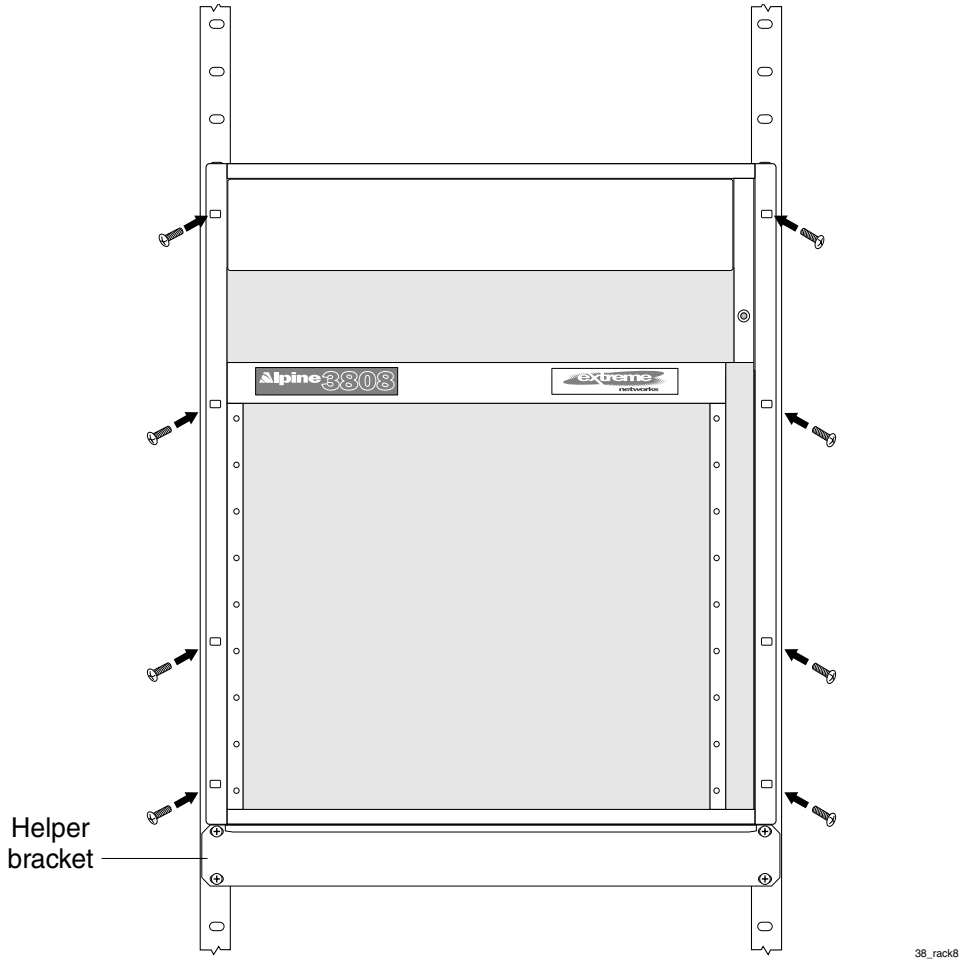


Figure 85: Alpine 3804 chassis with eight mounting screws

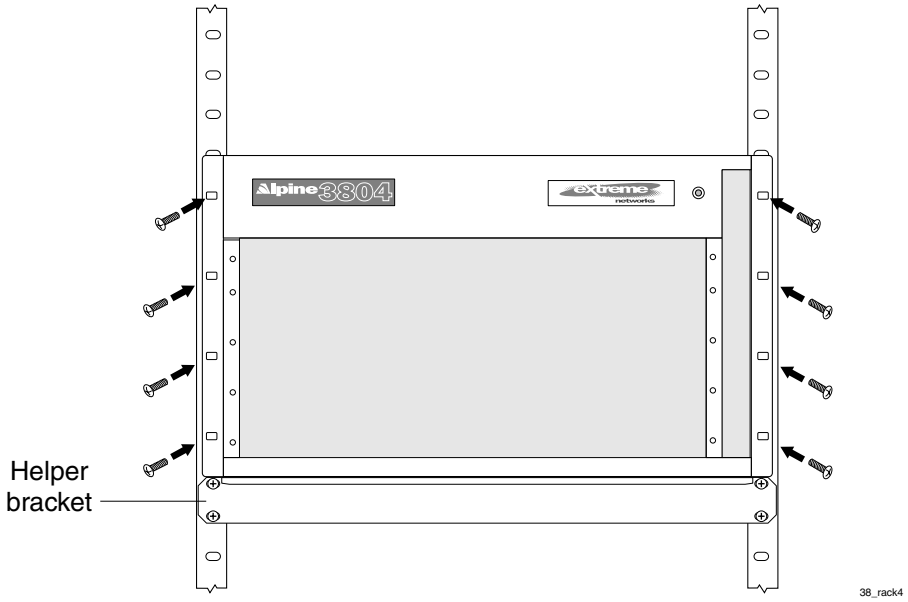
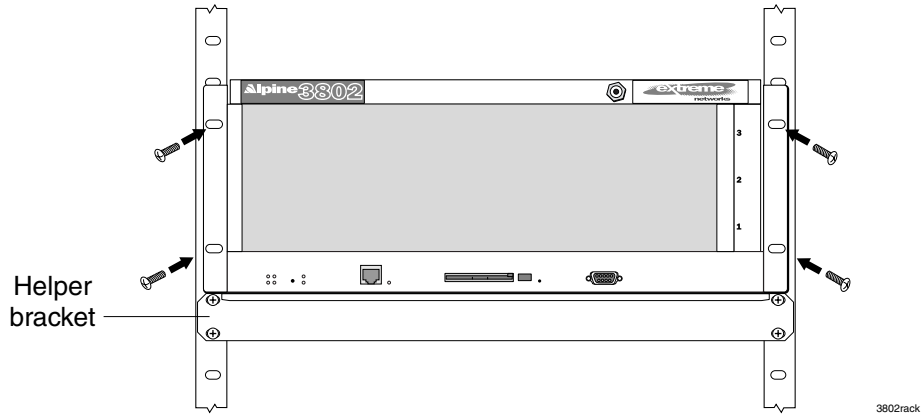


Figure 86: Alpine 3802 chassis with four mounting screws



6 After you secure the chassis, remove the helper bracket. Store it for future use, in case you need to remove the chassis.

Grounding the Alpine 3800 Series Chassis

The Alpine 3802 chassis has a pair of grounding studs on the back for attaching a two-hole ground lug using nuts and lockwashers. The Alpine 3804 and 3806 chassis have two integrated pem nuts for attaching a two-hole ground lug using screws.

Grounding the Alpine 3802 Chassis

To ground the Alpine 3802 chassis in accordance with NEBS standards, gather the following materials:

- Two zinc-plated steel lockwashers
- Two zinc-plated steel nuts
- One Panduit-style, standard two-hole barrel, copper compression lug
- AWG, high-strand-count copper wire cable, appropriate for your chassis
  - — 8 AWG for the Alpine 3808
  - — 10 AWG for the Alpine 3804
  - — 14 AWG for the Alpine 3802
- Flathead screwdriver

To ground the chassis:

1 Strip 0.5 inch (1.2 cm) of insulation from the appropriate AWG, high-strand-count copper wire cable.

2 Insert the cable into the cable lug.

CAUTION

Be sure that no copper is visible between the lug and the cable insulation.

3 Using a $^{1}/_{4}$-inch or $^{5}/_{16}$-inch flathead screwdriver, tighten the cable retention screw, to 20 inch-pounds of torque.

4 Attach the ground lug, lock washers, and nuts (in that order) to the grounding studs on the rear of the chassis. Tighten the nuts to 125 inch-pounds of torque.

After the chassis is installed, install power supplies and connect power as described in Chapter 8. Then install required modules as described in Chapter 9 and Chapter 10.

Grounding the Alpine 3804 or 3806 Chassis

To ground the Alpine 3804 or 3906 chassis, gather the following materials:

- Two 1/4-20 screws
- One copper, standard barrel 2-hole compression grounding lug, type LDC, equivalent to Panduit part number LCD4-14B-L
- Appropriate grounding wire for your system, based on the available input current for the power supply:
  - — For AC systems using a 20-Amp breaker per PSU (SSI AC), the chassis ground can be as small as 14 AWG.
  - — For DC systems using a 40-Amp breaker per PSU (SSI DC), the chassis ground can be as small as 10 AWG.
- Crimping tool
- Torque screwdriver

To ground the chassis:

1 Identify the grounding points on the back of the chassis.

2 Strip 0.5-inch (1.2-cm) of insulation from the stranded copper wire cable.

3 Insert the stripped wire into the cable lug.

CAUTION

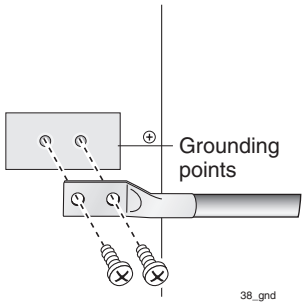
Be sure that no copper is visible between the lug and the cable insulation.

4 Crimp the lug onto the cable according to the manufacturer's specifications.

5 Insert the screws through the lug and into the grounding point on the back of the chassis (see Figure 87).

Tighten the screws to between 41 and 57 inch-pounds (between 4.63 and 6.44 Newton-meters).

Figure 87: Attaching the ground wire



6 Connect the other end of the wire to a known reliable earth ground point at your site.

Removing the Chassis

This section describes how to remove the Alpine 3800 series chassis from a rack.

To remove the Alpine 3800 series chassis from a rack, you need the following tools, equipment, and resources:

- Helper bracket (provided)
- A minimum of four appropriate screws to secure the helper bracket (not provided)
- # 1 Phillips screwdriver
- A minimum of two people to help remove the chassis from the rack

To remove the Alpine 3800 series chassis from a standard 19-inch (48.26 cm) rack:

1 Unplug the power cable from the outlet and then from the switch before you attempt to remove the chassis components and the chassis from the rack.

2 Mount the helper bracket in the rack directly beneath the chassis using four screws that are appropriate for your rack.

3 To reduce weight and prevent possible equipment damage, use a # 1 Phillips screwdriver to remove the following components:

- Power supply, SMMi, and I/O modules from the Alpine 3808 and Alpine 3804
- I/O modules from the Alpine 3802

For information about removing power supplies, see Chapter 8.
For information about removing the SMMi, see Chapter 9.
For information about removing I/O modules, see Chapter 10.

4 Unscrew the chassis from the rack.

5 Have a minimum of two people gently remove the chassis from the rack and place it on a secure, flat surface with the front of the chassis facing you.

6 Unscrew the helper bracket and remove it from the rack.

8 Installing and Connecting Alpine 3800 Series Switch Power Supplies

Alpine 3800 series switches accommodate either AC or DC power supplies. For the Alpine 3808 and 3804 switches, the power supplies are inserted into the chassis after you install the chassis in the equipment rack. The Alpine 3802 switch has factory-installed power supplies.

In addition to the internal power supplies, Alpine 3800 series switches can also have an external power supply, the EPD-LD. This power supply provides additional power to compatible Power over Ethernet (PoE) modules.

This chapter describes:

- Installing an Alpine 3808 or Alpine 3804 AC Power Supply on page 160
- Installing an Alpine 3808 or Alpine 3804 DC Power Supply on page 163
- Supplying Power to the Alpine 3802 DC Power Supply on page 167
- Verifying Successful Power Installation on page 168
- Removing the Alpine 3808 or Alpine 3804 AC Power Supply on page 169
- Removing the Alpine 3808 or Alpine 3804 DC Power Supply on page 170
- Installing the Alpine 3800 Series Switch External Power Supply on page 171

NOTE

Read the information in this chapter thoroughly before you attempt to install, remove, or supply power to any Alpine power supply.

NOTE

All installation, maintenance, and removal of a power supply must be done only by qualified, trained service personnel.

The Alpine 3800 series switch supports the power supply configurations listed in Table 30.

Table 30: Supported power supplies for the Alpine 3800 series switch

Switch Model	AC power supply	DC power supply	Hot-swappable
Alpine 3808[1]	Up to two AC power supplies can be installed.	Up to two DC power supplies can be installed.	Yes
Alpine 3804	Up to two AC power supplies can be installed.	Up to two DC power supplies can be installed.	Yes
Alpine 3802	Up to two AC power supplies can be installed.[2]	Two DC power supplies must be installed.	No

NOTE

If you require DC power supplies in the Alpine 3802 switch, two power supplies must be installed. The Alpine 3802 switch does not support a DC power configuration using only a single power supply.

Power Cords for the Alpine AC Power Supply

An AC power cord is not included with the Alpine AC power supply. To purchase an AC power cord, contact your local Extreme Networks Channel Account Manager or Sales Manager, or purchase a cord from your local supplier. All power cords must meet the requirements listed in "Power Cable" on page 310.

Installing an Alpine 3808 or Alpine 3804 AC Power Supply

This section describes how to install an AC power supply for either the Alpine 3808 or the Alpine 3804 switch. The Alpine 3802 switch power supply is preinstalled at the factory.

Complete the following tasks before installing the power supplies:

- Ground the rack (see "Protective Grounding for the Rack (Alpine and BlackDiamond Switches)" on page 40).
- Mount the chassis in a rack (see "Installing the Chassis in a Rack" on page 152).
- Ground the chassis (see "Grounding the Alpine 3800 Series Chassis" on page 155).

You need the following tools and equipment to install the Alpine 3808 and the Alpine 3804 AC power supplies:

- ESD-preventive wrist strap (provided)
- # 2 Phillips screwdriver

To install an Alpine 3808 or Alpine 3804 AC power supply:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top right corner of the switch front panel.
2. If a blank faceplate is covering the power supply bay, remove it and save it for future use.

3 Prepare the power supply for installation:

- Use the text on the front of the power supply to ensure that it is oriented correctly for either the Alpine 3808 or Alpine 3804.
- Move the safety latch to the "remove" position.
- Open the ejector/injector lever, as shown in Figure 88 and Figure 89.

CAUTION

When you insert a power supply, use one hand to support the power supply from the bottom and the other hand to hold the central handle on the front of the power supply. Do not use the ejector/injector lever to insert a power supply.

4 Use the central handle to guide the power supply into the power supply bay while supporting the supply from the bottom with your other hand.

Figure 88: AC power supply for the Alpine 3808 switch

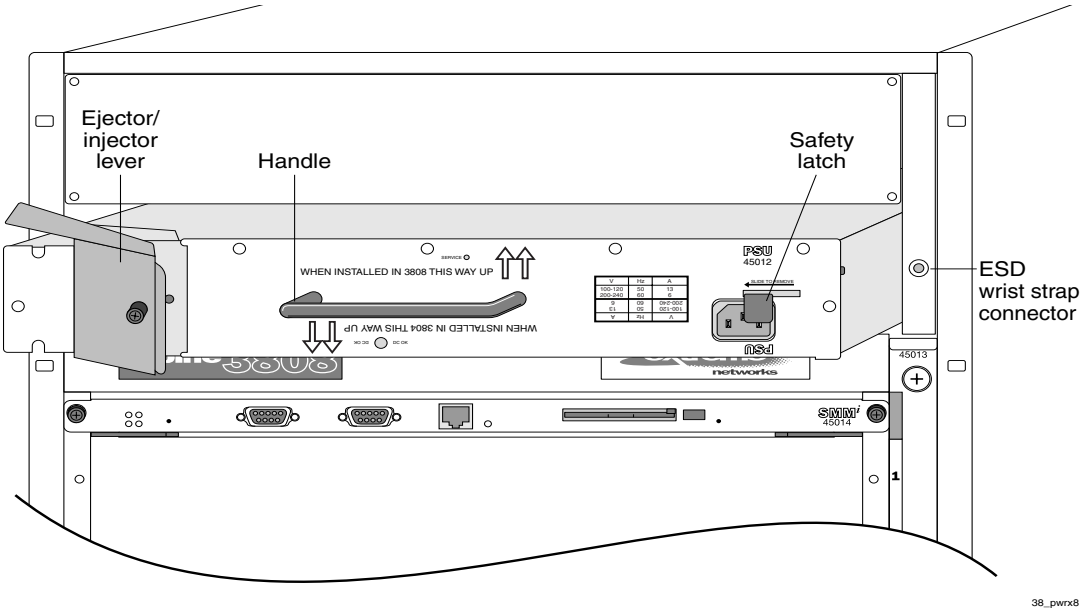
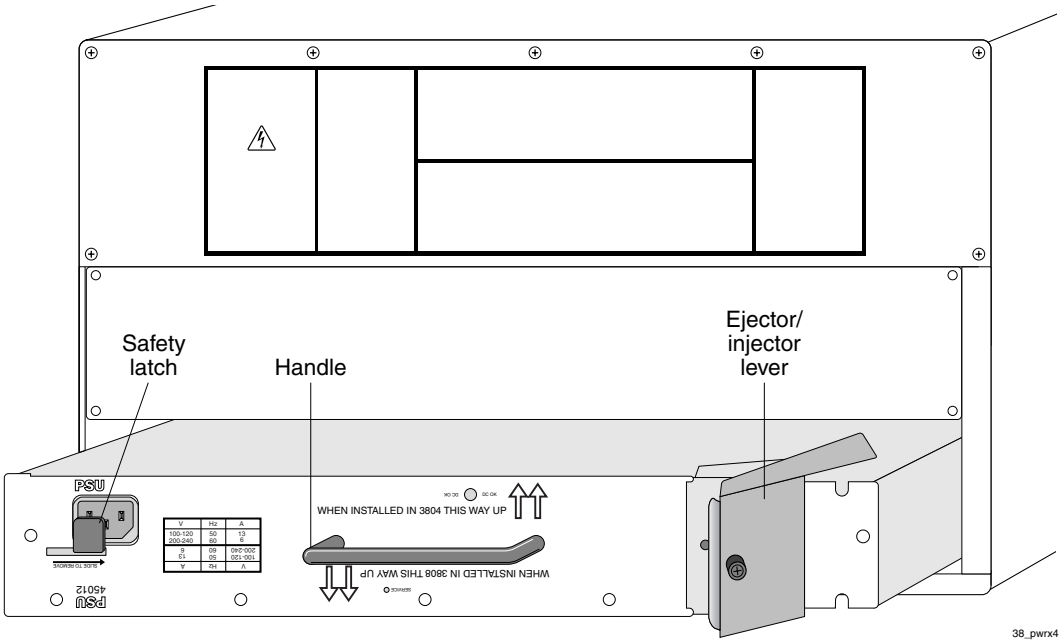


Figure 89: AC power supply for the Alpine 3804 switch



CAUTION

When you install the power supply, make sure the ejector/injector lever is open. Do not slam the power supply into the backplane. This or other excessive force can cause damage and may possibly require the return of the chassis.

5 Place one hand on each side of the power supply to slowly and evenly slide the power supply into the bay.

During the last inch of insertion into the chassis, place one hand on the central handle to steady the power supply and use your other hand to carefully push the ejector/injector lever toward the power supply to engage the power supply backplane connectors.

6 Using a #2 Phillips screwdriver, tighten the screw on the ejector/injector lever to secure the power supply.

7 To turn on power to the system:

a Slide the safety latch to the side to uncover the power connector.

b Connect the power cable to the power supply.

c Connect the power cable to the wall outlet.

CAUTION

The power supply cannot be installed if an AC power cable is plugged in. You can damage the chassis and power supply if you attempt to install a power supply with an AC power cable connected.

To install an additional power supply, repeat steps 1 through 7.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Installing an Alpine 3808 or Alpine 3804 DC Power Supply

To install an Alpine 3808 or Alpine 3804 DC power supply, complete the following tasks:

- Select the cabling.
- Install the DC power supply.
- Attach the cables and supply power.
- Verify a successful installation.

For centralized DC power connections, install only in a restricted access area.

Selecting and Preparing DC Cabling

Use the following guidelines when selecting cabling for the DC power supplies:

- Each DC power supply requires:
  - 30 A (Alpine 3808) at -48 VDC nominal
  - 16.5 A (Alpine 3804) at -48 VDC nominal

  Or equivalent power between -40 and -70 VDC.
- For DC power and ground cables, use:
  - 8 AWG, high-strand count copper wire cable (Alpine 3808)
  - 10 AWG, high-strand-count copper wire cable (Alpine 3804)

Use power cables with the specifications outlined in Table 31.

Table 31: Source DC power specifications for the Alpine 3808 and the Alpine 3804

Switch	Characteristic	Specification
Alpine 3808	DC power cable size	8 AWG, high-strand count copper wire
	DC power cable lug	Panduit copper, standard barrel, 2-hole lug—Type LDC (Panduit part number: LCD4-14A-L; Thomas & Betts part number: LCN4-14).
	Power	-40 - -70 VDC 30 A
Alpine 3804	DC power cable size	10 AWG, high-strand count copper wire
	DC power cable lug	Panduit copper, standard barrel, 2-hole lug—Type LDC (Panduit part number: LCD4-14A-L; Thomas & Betts part number: LCN4-14).
	Power	-40 - -70 VDC 16.5 A

For convenience, the necessary connection lugs used to connect the source DC cables to the power terminals are loosely mounted on the studs of the DC power supply. using lock washers and nuts.

To attach the cable to the lugs:

1. Strip 0.5 inch (1.27 cm) of insulation from the appropriate AWG, high-strand-count copper cable.
2. Insert the cable into the cable lug.
3. Using a 1/4-inch or 5/16-inch screwdriver, tighten the cable retention screw to 20 inch-pounds of torque.

CAUTION

Make sure that no copper is visible between the lug and the cable insulation.

Installing the Power Supply

This section describes how to install a DC power supply for either the Alpine 3808 switch or the Alpine 3804 switch.

Complete the following tasks before installing power supplies:

- Ground the rack (see "Protective Grounding for the Rack (Alpine and BlackDiamond Switches)" on page 40).
- Mount the chassis in a rack (see "Installing the Chassis in a Rack" on page 152).
- Ground the chassis (see "Grounding the Alpine 3800 Series Chassis" on page 155).

You need the following tools and equipment to install the Alpine 3808 and the Alpine 3804 DC power supplies:

- ESD-preventive wrist strap
- # 2 Phillips screwdriver
- 1/4-inch or 5/16-inch flathead screwdriver to connect power cables

To install an Alpine 3808 or Alpine 3804 DC power supply:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top right corner of the switch front panel.
2. If a blank faceplate is covering the power supply bay, remove it and save it for future use.
3. Prepare the power supply for installation, as shown in Figure 90 and Figure 91:
   - Use the text on the front of the power supply to ensure that it is oriented correctly for either the Alpine 3808 or Alpine 3804.
   - Open the ejector/injector lever.
   - Move the safety latch to the "remove" position.
   - Place the On/Off switch in the "off" position.

Figure 90: DC power supply for the Alpine 3808 switch

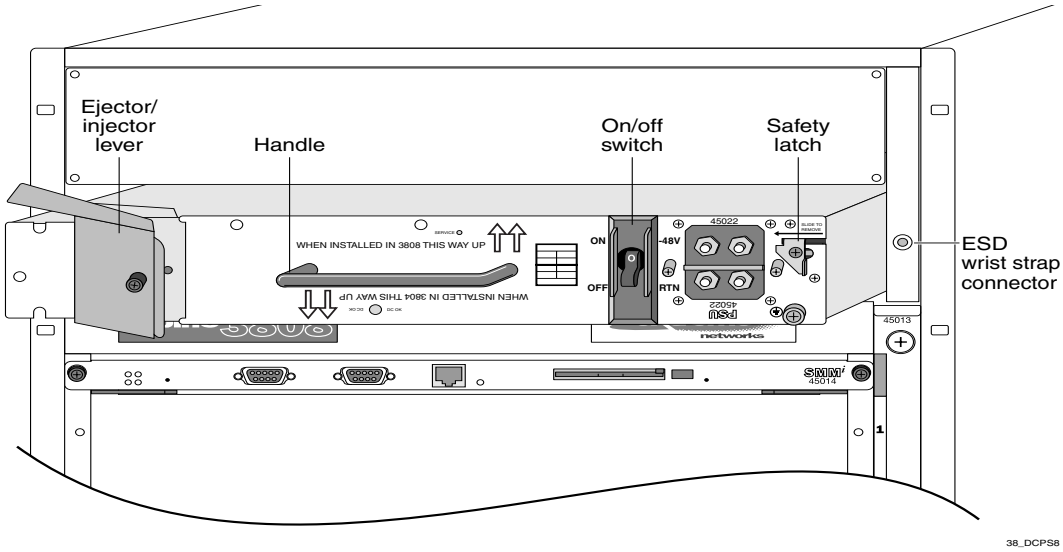
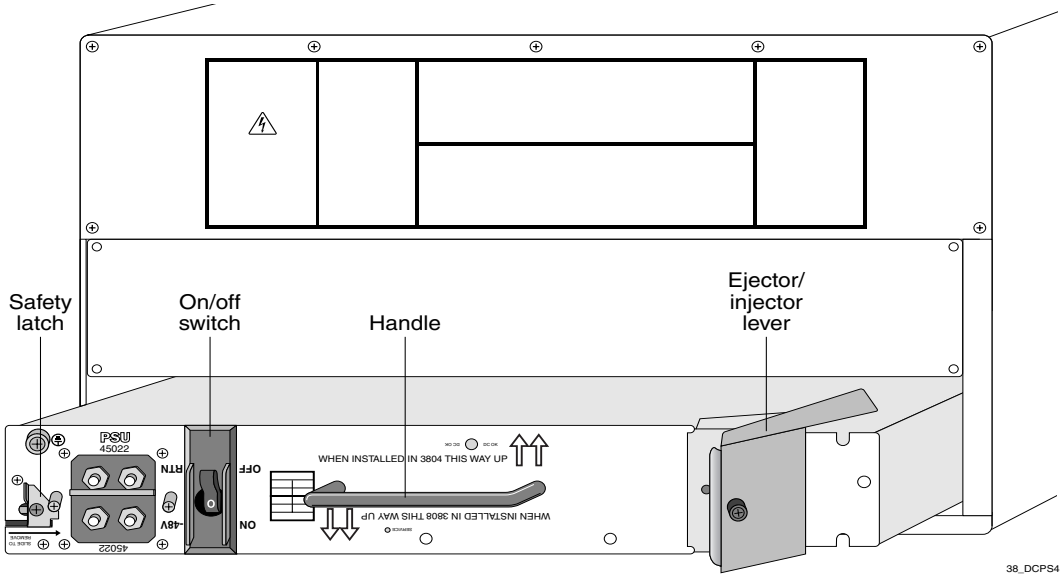


Figure 91: DC power supply for the Alpine 3804 switch



CAUTION

When you insert a power supply, use one hand to support the power supply from the bottom and the other hand to hold the central handle on the front of the power supply. Do not use the ejector/injector lever to insert a power supply.

4 Use the central handle to guide the power supply into the bay while supporting the supply from the bottom with your other hand.

CAUTION

Do not slam the power supply into the backplane. This or other excessive force can cause damage and may possibly require the return of the chassis.

5 Place one hand on each side of the power supply to slowly and evenly slide the power supply into the bay.

During the last inch of insertion into the chassis, place one hand on the central handle to steady the power supply and use your other hand to carefully push the ejector/injector lever toward the power supply to engage the power supply backplane connectors.

6 Using a #2 Phillips screwdriver, tighten the screw on the ejector/injector lever to secure the power supply.

7 Slide the locking safety latch away from the "remove" position.

To install an additional power supply, repeat steps 1 through 7.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Attaching the Cables and Supplying Power

After you install the power supply in the chassis, attach the cables that supply power to the chassis. To attach the cable to the DC power supply:

1 Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top right corner of the switch front panel.

2 Verify that the DC power is turned off at the source.

3 Remove the plexiglas cover that shields the power connection on the power supply.

4 Place the DC ground and power cable lugs over the studs on the power supply, as shown in Figure 92 and Figure 93.

Figure 92: Alpine 3808 DC power supply with cables

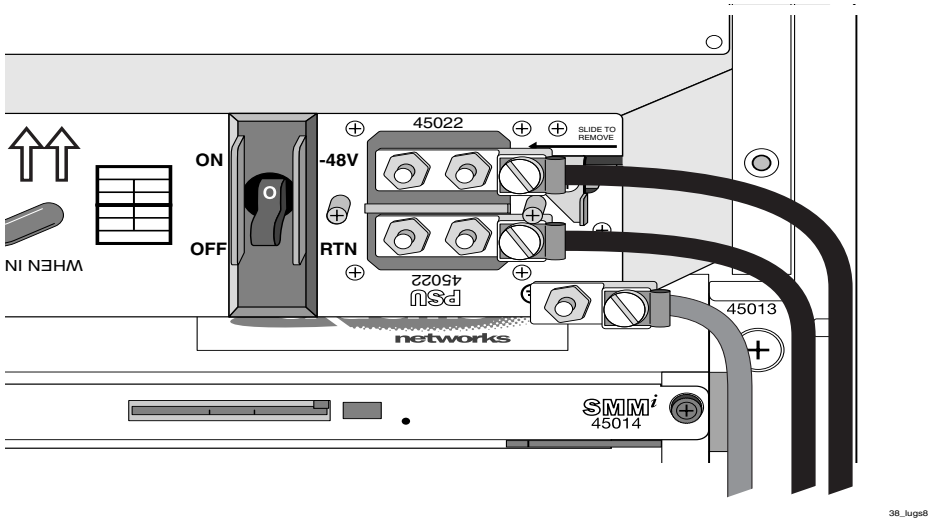
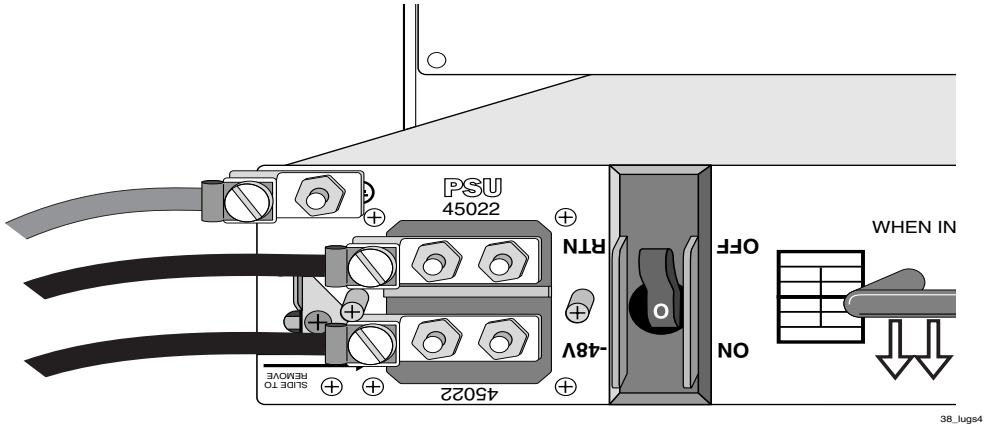


Figure 93: Alpine 3804 DC power supply with cables



5 Secure the cables using the lock washers and nuts.

6 Replace the plexiglas cover.

7 Turn on the DC supply at the wall breaker

8 Turn the on/off switch on the power supply to the on position.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Supplying Power to the Alpine 3802 DC Power Supply

The Alpine 3802 switch supports two DC power supplies that come preinstalled from the factory. To power on the Alpine 3802 DC power supplies, complete the following tasks:

- Select the cabling
- Attach the cables and supply power

For centralized DC power connections, install only in a restricted access area.

In the event of a power supply failure, contact Extreme Networks about servicing and replacing your power supply.

Selecting the Cabling

Use the following guidelines when selecting cabling for the DC power supplies:

- Each DC power supply requires 6.5 A at -48 VDC nominal (or equivalent power between -40 and -70 VDC).
- For DC power and ground cables, use 14 AWG, high-strand-count copper wire cable.

Use power cables with the specifications outlined in Table 32.

Table 32: Source DC power specifications for the Alpine 3802

Characteristic	Specification
DC power cable size	14 AWG, high-strand count copper wire
Power	-40 - -70 VDC 7.5 A max

Attaching the Cables and Supplying Power

After you install the Alpine 3802, you must attach the cables that supply power to the chassis. To attach the cable to the lugs, and then to the DC power supply, perform the following steps:

1 Attach the ESD strap to your wrist and connect the metal end of the ESD strap to the ground receptacle on the top right corner of the switch front panel.

2 Remove the plexiglas cover that shields the power connection on the power supply.

3 Strip 0.5 inches of insulation from the AWG, high strand-count copper cable.

4 Insert the cable into the DC ground and power cable lugs on the power supply.

CAUTION

Make sure that no copper is visible between the lug and the cable insulation.

5 Using a # 2 phillips screwdriver, tighten the cable retention screw, to a maximum of 10 inch-pounds (1.2 Nm) of torque.

6 Replace the plexiglas cover.

7 Turn on the DC supply at the wall breaker.

8 Turn on the power supply breaker.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Verifying Successful Power Installation

This sections describes how to verify successful power installation for any Alpine 3800 series switch. After you supply power to the Alpine switch, the switch performs a power-on self test (POST).

During the POST:

- All ports are temporarily disabled
- The packet LED is off
- The power LED is on
- The MGMT LED flashes until the switch successfully passes the POST

If the switch passes the POST, the MGMT LED blinks at a slow rate (one blink per second). If the switch fails the POST, the MGMT LED shows a solid yellow light.

NOTE

See Chapter 9, "Alpine 3800 Series Switch Management Module" for more information about switch management module LED activity and Chapter 10, "Alpine 3800 Series I/O Modules" for more information about I/O module LED activity.

Removing the Alpine 3808 or Alpine 3804 AC Power Supply

You need the following tools and equipment to remove the Alpine 3808 and the Alpine 3804 AC power supplies:

- ESD-preventive wrist strap
- # 2 Phillips screwdriver
- Replacement AC power supply

To remove an AC power supply from the Alpine 3808 or the Alpine 3804 switch:

1. Remove the AC power cable from the wall outlet and then from the power supply.
2. Attach the ESD strap to your wrist and connect the metal end of the ESD strap to the ground receptacle that is located on the top-right corner of the switch front panel.
3. Verify that the rack and chassis are grounded to protective earth ground.
4. Slide the safety latch to the left to cover the power connector.

   CAUTION

   Make sure that the latch covers the AC power connector. The power supply cannot be removed unless the connector is covered.

5. Use a #2 Phillips screwdriver to unscrew the screw on the ejector/injector lever then pull the ejector/injector lever towards you to disengage the power supply connectors from the backplane.

   Hold on to the central handle to steady the power supply.

   CAUTION

   When you remove a power supply, use one hand to support the power supply from the bottom and the other hand to hold the central handle on the front of the power supply. Do not use just the ejector/injector lever to remove a power supply.

6. Use one hand on the central handle to slowly pull the power supply towards you. Place your other hand beneath the power supply to support it as you pull it out of the chassis.
7. If you are going to install a replacement power supply, follow the installation steps on page 160.
8. If there is a problem with the power supply that you removed, contact Extreme Networks for assistance.

   Do not attempt to fix a faulty power supply. Personal injury to yourself or others may occur.
9. Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Removing the Alpine 3808 or Alpine 3804 DC Power Supply

You need the following tools and equipment to remove the Alpine 3808 and the Alpine 3804 DC power supplies:

- ESD-preventive wrist strap
- # 2 Phillips screwdriver
- Replacement DC power supply

To remove a DC power supply from the Alpine 3808 or the Alpine 3804 switch:

1. Turn the power supply on/off switch to the off position.
2. Turn off the DC power at the source.
3. Attach the ESD strap to your wrist and connect the metal end of the ESD strap to the ground receptacle on the top right corner of the switch front panel.
4. Verify that the rack and chassis are grounded to protective earth ground.
5. Remove the plexiglas cover that shields the power connection on the power supply.
6. Disconnect the DC power and ground cables as follows:
   a. Remove the plastic cover over the connection terminal block.
   b. Remove the nuts and lock washers holding the cable lug to the studs.
   c. Pull the cable lug off the studs.
7. Replace the plastic cover.
8. Slide the locking safety latch on the power supply in the direction marked “remove.”

CAUTION

Make sure that the latch is in the remove position. You cannot remove the power supply unless the latch is in the remove position.

9. Use a #2 Phillips screwdriver to unscrew the screw on the ejector/injector lever. Then pull the ejector/injector lever towards you to disengage the power supply connections from the backplane.

   Hold on to the central handle to steady the power supply.

CAUTION

When you remove a power supply, use one hand to support the power supply from the bottom and the other hand to hold the central handle on the front of the power supply. Do not use just the ejector/injector lever to remove a power supply.

10. Use one hand on the central handle to slowly pull the power supply towards you. Place your other hand beneath the power supply to support it as you pull it out of the chassis.
11. If you are going to install a replacement power supply, follow the installation steps on page 163.
12. If there is a problem with the power supply that you removed, contact Extreme Networks for assistance.

    Do not attempt to fix a faulty power supply. Personal injury to yourself or others may occur.

13 Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Installing the Alpine 3800 Series Switch External Power Supply

The Extreme Networks External Power Supply 45019 (EPS-LD) provides additional power to compatible Power over Ethernet (PoE) modules and other Extreme switches. The EPS-LD allows an attached FM-32Pi module to provide 334W to its ports.

The following items are provided with each EPS-LD unit:

- Mounting hardware, including screws
- One AC power cable for use in North America

NOTE

If you are using the EPS-LD outside North America, the input power cord must have an IEC320-C14 connector and the appropriate power input plug for the country in which you are operating. The cord must be no longer than 10 feet (3.05 m) and at least 16-gauge copper wire.

The cables connecting the power supply to the Extreme switch or module are purchased separately; contact your Extreme sales representative to purchase the cables. For more information, see "Connecting the EPS-LD to the FM-32Pi Module" on page 172. If you need redundant power, connect two EPS-LD units to the module using the special "Y" cable; this configuration provides no-fault redundant power to PoE ports.

CAUTION

Only trained service personnel should install or remove the Extreme EPS-LD unit, in accordance with the installation instructions. Before servicing this system, please read the safety information provided in Appendix A. Not following these precautions can result in equipment damage or shock.

Rack-Mounting the EPS-LD Unit

NOTE

When installing an EPS-LD in a rack, make sure air vents are not restricted. Allow for elevated ambient operating temperatures when installed adjacent to other equipment. Mount equipment within rack so a hazardous condition is not achieved because of uneven mechanical loading.

The EPS-LD unit can be mounted in a rack or placed free-standing on a tabletop. You can mount the EPS-LD facing either the front or the back of the rack. For this reason, each unit has two sets of mounting holes, two on each end. Mount the EPS-LD so that the unit's output connectors are on the same side as the external connector on the connecting switch.

CAUTION

Do not use the rack-mount kits to suspend the EPS-LD under a table or desk, or to attach the switch to a wall.

To install the EPS-LD, you need the following tools and materials:

- ES-preventive wrist strap
- A #1 Phillips screwdriver

To rack mount each EPS-LD unit:

1 Place the EPS-LD unit upright on a hard flat surface, with the side you want to face to the front of the switch toward you.

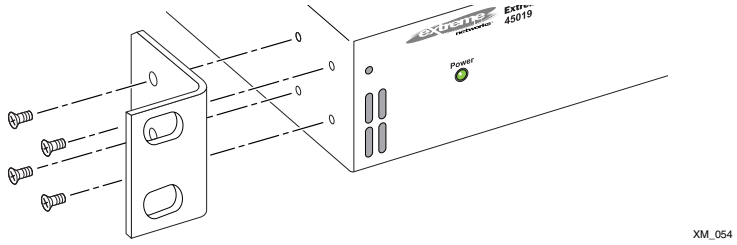
2 Verify that the rack and chassis are grounded to protective earth ground.

3 Remove the mounting bracket kit (including screws) from the packaging.

4 Locate a mounting bracket over the mounting holes on one side of the unit.

5 Insert the screws, as shown in Figure 94, and fully tighten the screws using a #1 Phillips screwdriver.

Figure 94: Fitting the mounting bracket



6 Repeat steps 4 and 5 for the other side of the EPS-LD unit.

7 Insert the EPS-LD unit into a 19-inch rack.

NOTE

Mount the EPS-LD so that the output connectors are on the same side (front or back) as the external connector on the connecting switch. If you mount the EPS-LD with the connectors facing in the opposite direction from the Extreme switch connector, leave at least 1 U between the switch and the EPS-LD through which to slide the cables. Do not route the cables around the equipment rack.

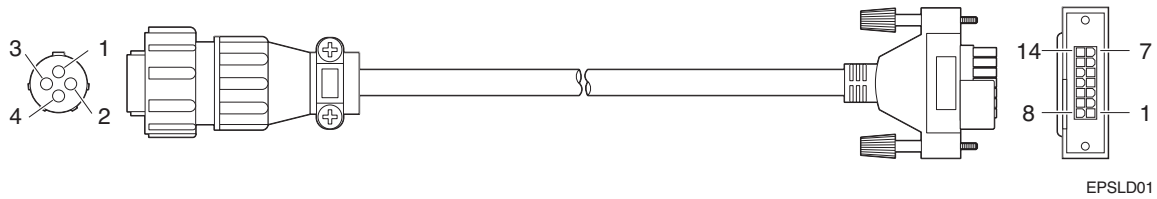
8 Insert the screws into the rack and the mounting bracket on both sides of the unit and fully tighten with a suitable screwdriver.

Connecting the EPS-LD to the FM-32Pi Module

To use the EPS-LD unit to provide power to the Alpine FM-32Pi module, you need a special external power supply cable to connect the module to the EPS-LD unit.

The EPS-LD external power cable kit contains one 1.5 meter long 14-pin to 4-pin connecting cable, as shown in Figure 95.

Figure 95: EPS-LD connecting cable for connecting to PoE modules



NOTE

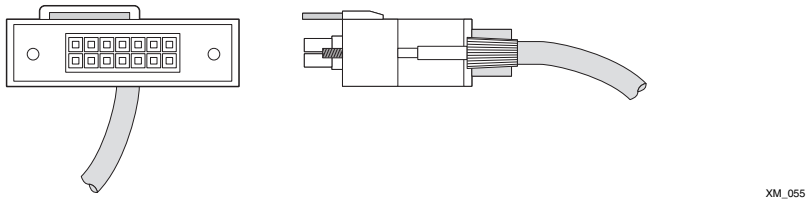
Only trained service personnel should install or remove the Extreme EPS-LD unit, in accordance with the installation instructions. Before servicing this system, please read the safety information provided in Appendix A. Not following these precautions can result in equipment damage or shock.

CAUTION

Do not attach the AC power cord to the EPS-LD unit until the unit is properly grounded at the electrical outlet and the redundant power supply cable is connected.

One end of the EPS-LD cable has a keyed connector to ensure correct alignment of the connector (Figure 96). The key is a plastic tab on the cable connector housing that fits into the EPS-LD unit.

Figure 96: EPS-LD cable with key



To connect the EPS-LD cable:

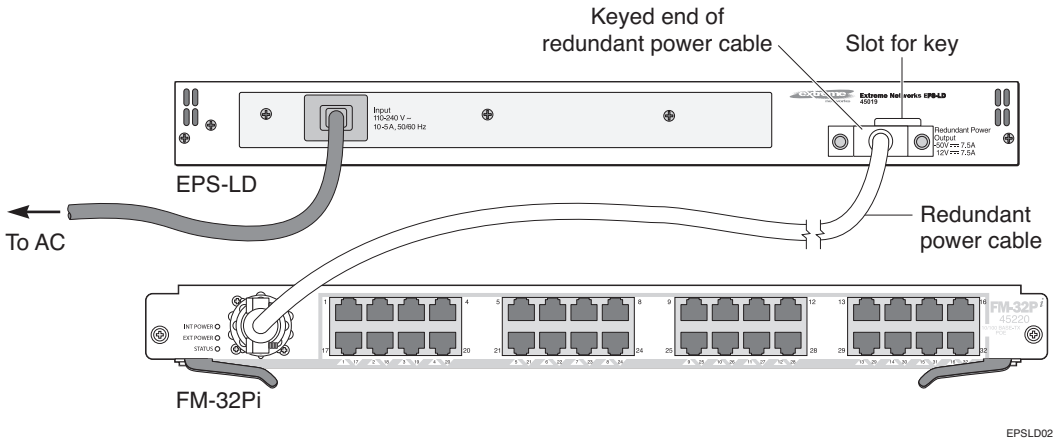
1 Connect the keyed end of the EPS-LD cable to the power supply unit(s).
See Figure 97 to locate the connectors on the EPS-LD unit and on the FM32Pi module.

NOTE

The cable length is 1.5 meters.

2 Connect the other end to the circular power connector on the front panel of the FM-32Pi.

Figure 97: Connecting an EPS-LD unit to a FM32Pi module



3 Connect the AC input power cable to the AC connector on the EPS-LD unit.

CAUTION

The EPS-LD unit does not have a switch for turning the unit on and off. You disconnect power to the EPS-LD unit by removing the plug from the electrical outlet. Make sure this connection is easily accessible.

4 Connect the other end of the AC cable to the electrical outlet.

Make sure the electrical outlet is properly grounded.

NOTE

Consider all the equipment connected to the power supply circuit to ensure that the circuit is not overloaded. Use proper overcurrent protection, such as a circuit breaker, to prevent overcurrent conditions.

The Power LED on the front of the EPS-LD unit turns solid green to indicate that it is ready. Table 33 shows the possible LED status for the power supply.

Table 33: LED status for EPS-LD Power LED

Power LED	Indicates
Green, solid	The external power supply is operating normally.
Off	The external power supply is not connected.

Removing an EPS-LD Unit

To remove an EPS-LD unit:

1 Disconnect the AC power by removing the plug from the wall.

2 Disconnect the AC power cord from the EPS-LD unit.

3 Remove the cable that connects to the Extreme switch from the EPS-LD unit.

4 Loosen the thumbscrews on the front of the EPS-LD mounting racks.

5 Slide EPS-LD unit out of rack.

9 Alpine 3800 Series Switch Management Module

This chapter describes:

- Installing SMMi Modules on page 177
- Replacing SMMi Modules on page 178

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove the Alpine Switch Management Module (SMMi).

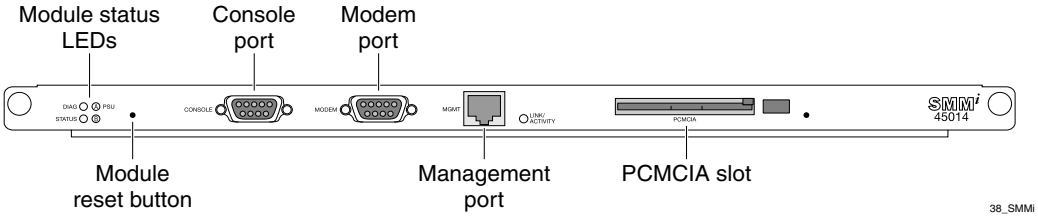
The Switch Management Module (SMMi) is responsible for upper-layer protocol processing and switch management functions in the Alpine 3808 and Alpine 3804 chassis. The SMMi can store two ExtremeWare software images (version 6.0 or later) and two switch configurations. An Alpine 3808 or Alpine 3804 switch requires an installed SMMi.

NOTE

The Alpine 3802 switch does not require a separate Switch Management Module. All upper-layer protocol processing and switch management functions are part of the integrated Switch Management Module that is in the chassis.

Figure 98 shows the front view of the SMMi.

Figure 98: Switch Management Module (SMMi)



The SMMi module consists of a printed circuit board mounted on a metal panel that acts as the insertion vehicle in an Alpine 3808 and Alpine 3804 chassis. The module carrier also includes ejector/injector levers and captive retaining screws at each end of the module front panel.

The SMMi has the following out-of-band management ports:

- Console port—Used to connect a terminal and perform local management.
- Management port—Used to connect an Ethernet cable directly from your laptop into the management port to view and locally manage the switch configurations.
- Modem port —Used to connect a modem for remote access to the CLI.
- PCMCIA slot—Reserved for future use.

See "Management Ports" in Chapter 1 for more information about management ports. For specifications of the Alpine SMMi module specifications, see Appendix C, "Module Technical Specifications."

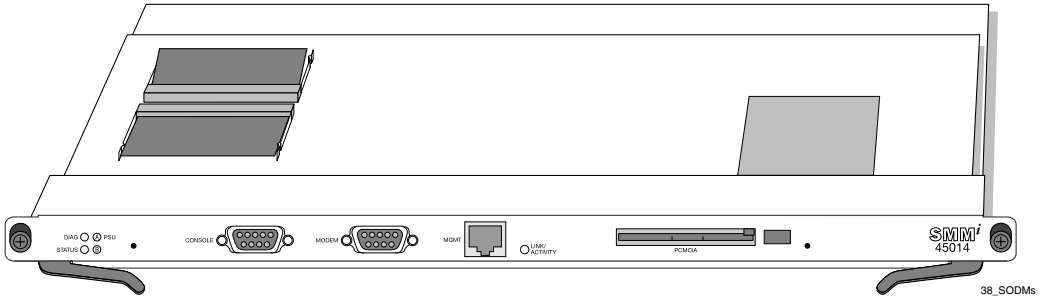
SMMi Memory

The SMMi has two 144-pin SODIMM sockets, and ships with two 128 MB SODRAM modules installed, as shown in Figure 99.

NOTE

The SMMi supports only the SODIMMs that are supplied by Extreme Networks.

Figure 99: SMMi SODIMM sockets



SMMi LEDs

Table 34 describes the LED activity on the SMMi.

Table 34: SMMi LEDs

LED	Color	Indicates
DIAG	Green blinking	Power-on Self Test (POST) is running
	Off	Normal operation
STATUS	Green blinking	Normal operation
	Yellow blinking	Critical error, fan failure or over temperature
	Off	Unit powered down
PSU A	Green	PSU is OK
PSU B	Amber	DC output failure
	Off	PSU not present or not powered

Installing SMMi Modules

You can insert the SMMi module at any time, without causing disruption of network services.

You need the following tools and equipment to install the SMMi module:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver

To install the SMMi:

1 Locate the top, unnumbered slot of the chassis.

This is where you install the SMMi.

CAUTION

You can install the SMMi only in the designated, top (orange) slot of the Alpine 3808 or 3804 chassis. SMMi modules do not fit in numbered slots. Forceful insertion can damage the module.

2 Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top right corner of the switch front panel.

3 Remove the blank faceplate from the slot to make room for the module, if applicable.

NOTE

Any unoccupied module slot in the chassis should have a blank faceplate installed to ensure satisfactory protection from EMI and to guarantee adequate airflow through the chassis.

4 Hold the module by its front panel with one hand, and place your other hand under the edge of the metal panel.

Check the connectors for dust and packing materials.

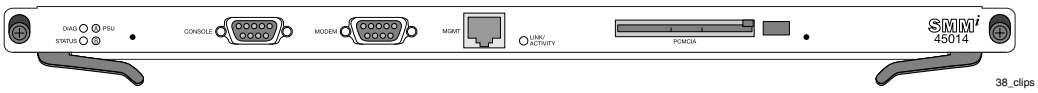
CAUTION

To prevent ESD damage, handle the module only by the metal panel edges. Never touch the components on the printed circuit board (PCB) or the pins on any of the connectors.

5 Hold the SMMi horizontal as shown in Figure 100, with the inserter/ejector levers at the bottom.

6 Make sure the ejector/injector levers are extended.

Figure 100: SMMi with open ejector/injector levers



7 Slide the module into the top slot of the chassis, until it makes contact with the backplane.

NOTE

Use the metal panel, not the PCB, to guide the SMMi.

As the module begins to seat in the chassis, the ejector/injector levers begin to close.

8 To close the ejector/injector levers, use both hands to push the levers toward the center of the module. Apply equal pressure to each lever.

9 Using a #2 Phillips screwdriver, tighten the two captive screws to secure the module to the chassis.

NOTE

Tighten the screws of this module before *you insert additional modules. Otherwise, you might unseat modules that you have not secured.*

10 Store the module packaging for future use.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Verifying the SMMi Installation

After you install the SMMi, verify that it is working correctly by checking the LEDs on the front panel of the module. If it is operating normally, the front-panel LED indicators appear as follows:

- STATUS LED—green blinking
- DIAG LED—off
- PSU A, B, or both LEDs—green

For more information about SMMi LED activity, see "SMMi LEDs" on page 176.

Replacing SMMi Modules

All Alpine 3800 series modules (SMMi and I/O modules) are hot-swappable. You do not need to power off the system to remove a module.

You need the following tools and equipment to replace an SMMi module:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver
- Antistatic packaging
- Replacement SMMi module

To remove an SMMi module:

1 Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top right corner of the switch front panel.

2 Use a #2 Phillips screwdriver to unscrew the two captive screws.

3 Simultaneously rotate the ejector/injector levers away from the center of the module to disengage the module from the backplane.

4 Slide the module out of the chassis. Hold the module front panel with one hand, and place your other hand under the metal panel to support the module.

CAUTION

To prevent ESD damage, handle the module by the metal panel edges only. Never touch the components on the PCB or pins on any of the connectors.

5 Immediately place the removed module into an antistatic bag to protect it from ESD damage and to prevent dust from collecting on the module connectors.

6 Install a replacement SMMi, following the installation procedure described on page 177.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

10 Alpine 3800 Series I/O Modules

This chapter includes the following topics:

- Configuring I/O Modules on page 181
- I/O module descriptions, starting on page 183
- Installing I/O Modules on page 204
- Removing I/O Modules on page 206

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove any Alpine I/O modules.

Alpine I/O modules consist of a printed circuit board mounted on a metal panel that acts as the insertion vehicle in an Alpine 3800 series switch. The module carrier also includes ejector/injector levers and captive retaining screws at each end of the module front panel.

For more information about Alpine I/O module specifications, see Appendix C, "Module Technical Specifications."

Configuring I/O Modules

No configuration information is stored on the I/O modules; configuration information is stored on the SMMi for the Alpine 3808 and 3804 chassis and the integrated Switch Management Module in the Alpine 3802 chassis.

NOTE

There is a slight difference in appearance between Alpine I/O modules. Alpine Ethernet I/O modules have a green stripe along the side of the module. Alpine Access I/O modules have a silver stripe along the side of the module.

When the Alpine 3800 series switch is powered on, ExtremeWare generates a default configuration for any slots with I/O modules. The default configuration allows the I/O module ports to participate in the VLAN named *default*. The default configuration for the I/O module is not preserved unless you explicitly save the information to nonvolatile RAM (NVRAM).

You can configure parameters of the I/O module after it is installed or you can pre-configure a slot for a certain type of module and configuration. The pre-configured information is applied to the module after it is inserted. If you pre-configure a slot for a specific module type, and then insert a different type of module, the module reverts to its default configuration.

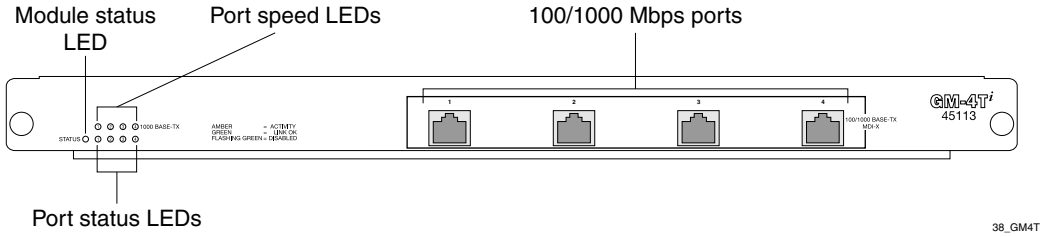
NOTE

See the ExtremeWare Software User Guide *and the* ExtremeWare Command Reference Guide *for more information about configuring I/O modules.*

GM-4Ti Module

Figure 101 shows the GM-4Ti module.

Figure 101: GM-4Ti module



The GM-4Ti module has four Gigabit Ethernet ports. All Gigabit Ethernet ports on this module use standard RJ-45 connectors and autonegotiate for 100BASE-TX or 1000BASE-T.

The default configuration of the GM-4Ti module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in autonegotiation mode.

LEDs

The GM-4Ti module has the following LEDs:

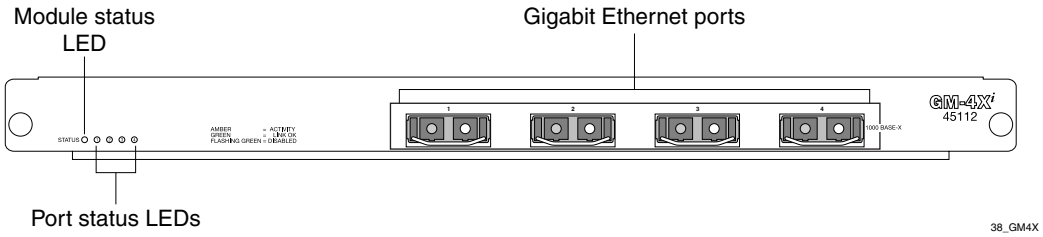
- Module status
- Port status
- Port speed

For information about the LEDs and their activity on the GM-4Ti module, see “I/O Module LEDs” on page 202.

GM-4Xi Module

Figure 102 shows the GM-4Xi module.

Figure 102: GM-4Xi module



The GM-4Xi module has four GBIC-based Gigabit Ethernet ports. All Gigabit Ethernet ports on this module use standard GBIC connectors and support 1000BASE-SX, 1000BASE-LX, and 1000BASE-LX70.

The default configuration of the GM-4Xi module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in autonegotiation mode.

GBIC Ports

The GM-4Xi module supports the following GBICs:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LX70
- ZX GBIC
- LX100 GBIC
- UTP GBIC

For information about the media types and associated maximum distances for each GBIC type, see "GBIC Specifications" on page 340.

An Alpine 3800 switch populated with GM-4Xi modules supports the following GBIC configurations:

- Install a maximum of three LX100 GBICs per GM-4Xi module; the fourth GBIC slot must remain empty
- Install two or fewer LX100 GBICs per GM-4Xi module and leave the remaining GBIC slots empty
- Install two or fewer LX100 GBICs per GM-4Xi module and install any combination of the following GBICs in the empty slots:
  - 1000BASE-SX
  - 1000BASE-LX
  - ZX GBIC
  - ZX Rev 03
  - LX70
  - UTP GBIC

NOTE

For more information about the supported GBIC types, see “GBIC Specifications” on page 340.

To ensure correct operation of the LX100 GBIC, make sure you run ExtremeWare 6.1.9 or later on your switch.

LEDs

The GM-4Xi module has the following LEDs:

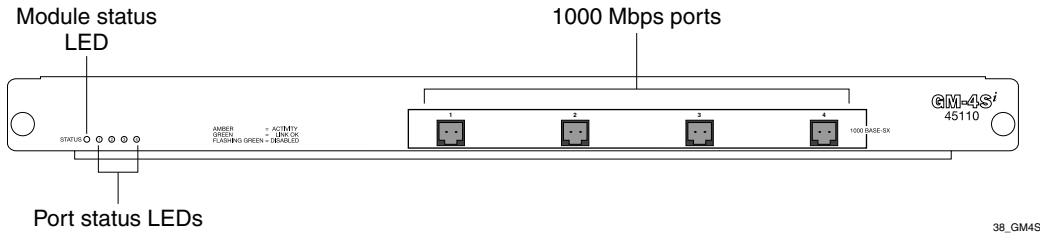
- Module status
- Port status

For information about the LEDs and their activity on the GM-4Xi module, see “I/O Module LEDs” on page 202.

GM-4Si Module

Figure 103 shows the GM-4Si module.

Figure 103: GM-4Si module



The GM-4Si module has four Gigabit Ethernet ports using standard MT-RJ connectors. The GM-4Si module supports 1000BASE-SX only.

The default configuration of the GM-4Si module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in autonegotiation mode.

For optical specifications of the GM-4Si module, see Table 109 on page 349.

LEDs

The GM-4Si module has the following LEDs:

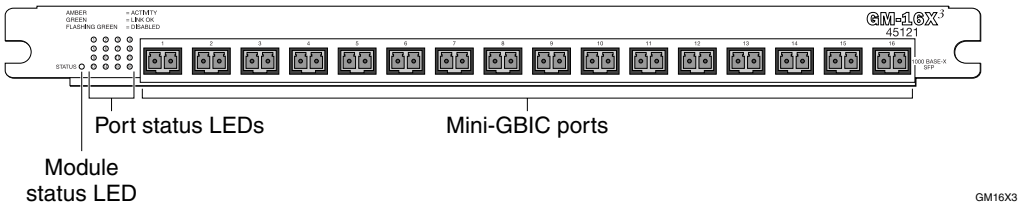
- Module status
- Port status

For information about the LEDs and their activity on the GM-4Si module, see “I/O Module LEDs” on page 202.

GM-16X³ Module

Figure 104 shows the GM-16X³ module.

Figure 104: GM-16X³ module



The GM-16X³ module has 16 1000BASE-X ports using mini-GBIC (or small form factor pluggable (SFP)) slots.

The GM-16X³ ports are oversubscribed 4:1 to the Alpine backplane. The module has four groups of four ports each. Each group multiplexes traffic into a single full-duplex gigabit link to the switch fabric.

To take advantage of this architecture, use a single port in each group before using all of the ports in any particular group. Table 35 lists the port groups for the GM-16X³ module.

Table 35: GM-16X³ port groups

Ports	Group
1, 2, 3, 4	1
5, 6, 7, 8	2
9, 10, 11, 12	3
13, 14, 15, 16	4

Populate ports 1, 5, 9, and 13; then ports 2, 6, 10, and 14; then ports 3, 7, 11; and 15, and finally ports 4, 8, 12, and 16.

NOTE

If congestion is detected on a port with flow control enabled, a flow control PAUSE frame is sent out that port. The PAUSE frame is not sent out on the other ports in the group.

Table 36 lists the number of GM-16X³ modules you can install in an Alpine chassis.

Table 36: GM-16X³ configurations supported

Chassis	GM-16X³ Modules
Alpine 3802	1 (or 1 GM-16T³ module), installed in slot 1 or slot 2 only
Alpine 3804	4
Alpine 3808	8

Table 37 describes the media types and the associated maximum distances for the GM-16X3 module.

Table 37: GM-16X3 media types and distances

Mini-GBIC Type	Media Type	Maximum Distance (meters)
1000BASE-SX	multimode fiber	550
1000BASE-LX	single-mode fiber	10,000
1000BASE-ZX	single-mode fiber	70,000

Each of the 16 ports in the GM-16X3 is capable of supporting up to a full gigabit of traffic with a maximum module throughput of 4 Gigabits to the Alpine backplane. When a GM-16X3 is operational in an Alpine 3808, and five or more ports of ports 1 through 8 or ports 9 through 16 are simultaneously forwarding unusually high rates of small, uniformly sized packets (for example, 64 Byte), the bandwidth through each port can be lower than the expected minimum of 250 Mbps.

When you install and configure a GM-16X3 module, Extreme Networks does not recommend using the port-based load-sharing (link-aggregation) algorithm when the share has more than four ports because traffic coming from the GM-16X3 or GM-16T3 modules will only load-share over the first four ports of the share. Load-sharing using other load balancing algorithms can have up to eight links.

Mini-GBIC Ports

The GM-16X3 module supports any of the following mini-GBICS:

- SX mini-GBIC
- LX mini-GBIC
- ZX mini-GBIC

NOTE

For more information about the supported mini-GBIC types, see “Mini-GBIC Types” on page 23.

LEDs

The GM-16X3 module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the GM-16X3 module, see “I/O Module LEDs” on page 202.

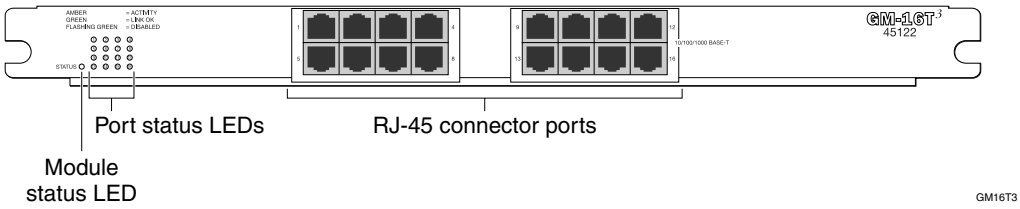
Software Requirements

The GM-16X3 module requires ExtremeWare version 7.0.1b11 or later and BootROM 7.8 or later on the switch.

GM-16T³ Module

Figure 105 shows the GM-16T³ module.

Figure 105: GM-16T³ module



The GM-16T³ module has 16 10/100/1000BASE-T ports using RJ-45 connectors that autonegotiate for 10BASE-T, 100BASE-T, or 1000BASE-T.

The GM-16T³ ports are oversubscribed 4:1 to the Alpine backplane. The module has four groups of four ports each. Each group multiplexes traffic into a single full-duplex gigabit link to the switch fabric.

To take advantage of this architecture, use a single port in each group before using all of the ports in any particular group. Table 38 lists the port groups for the GM-16T³ module.

Table 38: GM-16T³ port groups

Ports	Group
1, 2, 3, 4	1
5, 6, 7, 8	2
9, 10, 11, 12	3
13, 14, 15, 16	4

Populate ports 1, 5, 9, and 13; then ports 2, 6, 10, and 14; then ports 3, 7, 11, and 15; and finally ports 4, 8, 12, and 16.

NOTE

If congestion is detected on a port with flow control enabled, a flow control PAUSE frame is sent out that port. The PAUSE frame is not sent out on the other ports in the group.

Table 39 lists the number of GM-16T³ modules you can install in an Alpine chassis.

Table 39: GM-16T³ configurations supported

Chassis	GM-16T³ Modules
Alpine 3802	1 (or 1 GM-16X³ module), installed in slot 1 or slot 2 only
Alpine 3804	4
Alpine 3808	8

The GM-16T^3 module supports distances of up to 100 meters over CAT 5 cabling.

Each of the 16 ports in the GM-16T^3 is capable of supporting up to a full gigabit of traffic with a maximum module throughput of 4 Gigabits to the Alpine backplane. When a GM-16T^3 is operational in an Alpine 3808, and five or more ports of ports 1 through 8 or ports 9 through 16 are simultaneously forwarding unusually high rates of small, uniformly sized packets (for example, 64 Byte), the bandwidth through each port can be lower than the expected minimum of 250 Mbps.

When you install and configure a GM-16T^3 module, Extreme Networks does not recommend using the port-based load-sharing (link-aggregation) algorithm when the share has more than four ports because traffic coming from the GM-16T^3 or GM-16X^3 modules will only load-share over the first four ports of the share. Load-sharing using other load balancing algorithms can have up to eight links.

LEDs

The GM-16T^3 module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the GM-16T^3 module, see “I/O Module LEDs” on page 202.

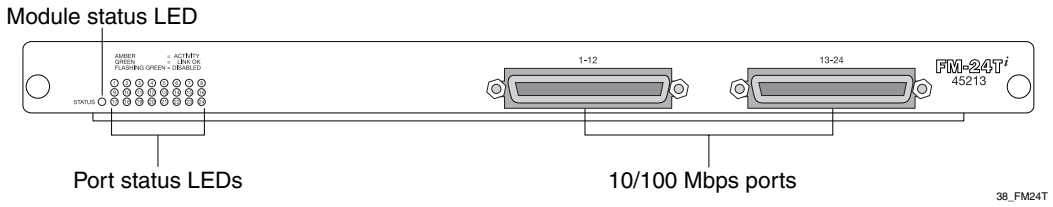
Software Requirements

The GM-16T^3 module requires ExtremeWare version 7.0.1b11 or later and BootROM 7.8 or later on the switch.

FM-24Ti Module

Figure 106 shows the FM-24Ti module.

Figure 106: FM-24Ti module



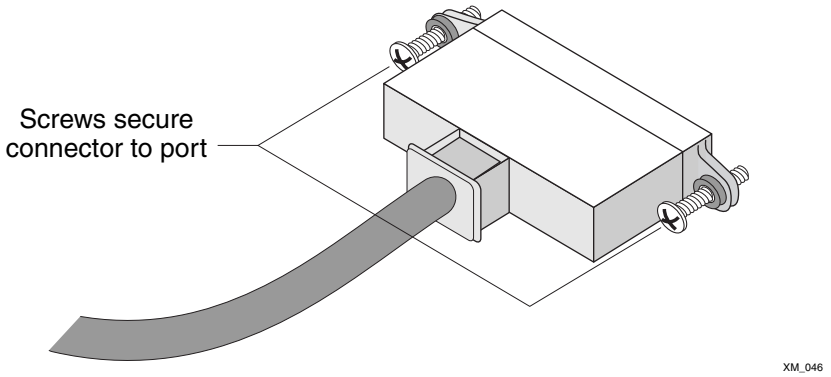
The FM-24Ti module has 24 10/100 Mbps autonegotiating Ethernet ports, using standard RJ-21 connectors. The FM-24Ti module supports 10BASE-T and 100BASE-TX.

To connect the ports, use a 180-degree male RJ-21 connector with a shielded PVC trunk cable. secure the connector to a maximum of 4 inch-pounds of torque. You can access the ports in one of the following ways:

- Through a patch panel by terminating the cable and shield with an RJ-21 connector.
- Directly by using a cable that is terminated with 12 RJ-45 connectors.

The RJ-21 connector is shown in Figure 107. For cable specifications, see Table 112 on on page 351.

Figure 107: RJ-21 connector



The default configuration of the FM-24Ti module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in autonegotiation mode.

LEDs

The FM-24Ti module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the FM-24Ti module, see “I/O Module LEDs” on page 202.

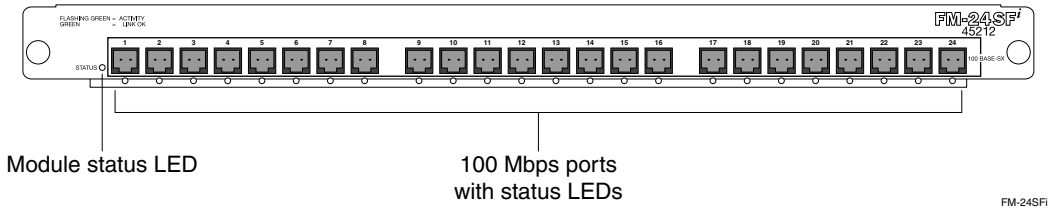
Software Requirements

The FM-24Ti module requires ExtremeWare version 6.1.7 or later and BootROM 6.5 or later on the switch.

FM-24SFi Module

Figure 108 shows the FM-24SFi module.

Figure 108: FM-24SFi module



The FM-24SFi module has 24 100 Mbps Ethernet ports, using standard MT-RJ connectors. The FM-24SFi module supports 100BASE-FX in single mode only.

The default configuration of the FM-24SFi module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in 100 Mbps, single mode. Half-duplex mode is not supported.

The total optical system budget for the FM-24SFi module is 11 dB. Measure cable plant losses with a 1310 nm light source to verify that your cable plant losses are within the optical budget. Table 114 on page 352 describes the optical specifications for the FM-24SFi module.

LEDs

The FM-24SFi module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the FM-24SFi module, see “I/O Module LEDs” on page 202.

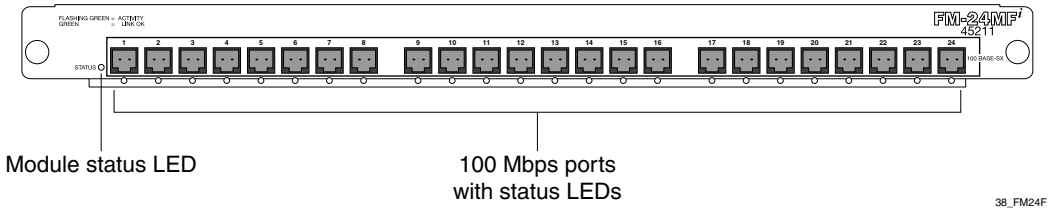
Software Requirements

The FM-24SFi module requires ExtremeWare version 6.1.7 or later and BootROM 6.5 or later on the switch.

FM-24MFi Module

Figure 109 shows the FM-24MFi module.

Figure 109: FM-24MFi module



The FM-24MFi module has 24 100 Mbps Ethernet ports, using standard MT-RJ connectors. The FM-24MFi module supports 100BASE-FX in multi-mode only.

The default configuration of the FM-24MFi module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in 100 Mbps, multi-mode. Half-duplex mode is not supported.

The total optical system budget for the FM-24MFi module is 11 dB. Measure cable plant losses with a 1310 nm light source to verify that your cable plant losses are within the optical budget. Table 115 on page 353 describes the optical specifications for the FM-24MFi module

LEDs

The FM-24MFi module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the FM-24MFi module, see “I/O Module LEDs” on page 202.

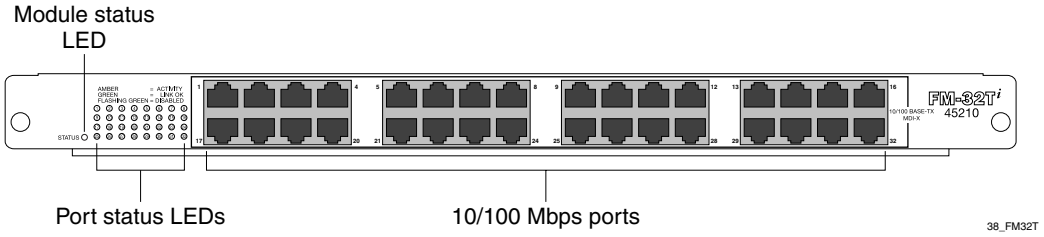
Software Requirements

The SMMi requires ExtremeWare version 6.1.5 or later to operate the FM-24MFi.

FM-32Ti Module

Figure 110 shows the FM-32Ti module.

Figure 110: FM-32Ti module



The FM-32Ti module has 32 10/100 Mpbs autonegotiating Ethernet ports using standard RJ-45 connectors. The FM-32Ti module supports autonegotitation of 10BASE-T and 100BASE-TX.

The default configuration of the FM-32Ti module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so on).
- Operate in autonegotiation mode.

LEDs

The FM-32Ti module has the following LEDs:

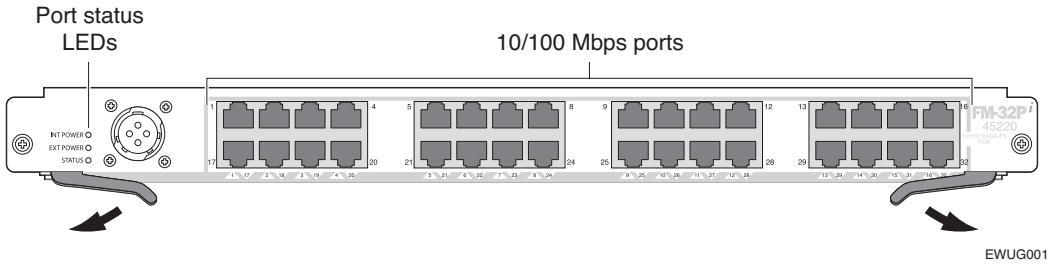
- Module status
- Port status

For information about the LEDs and their activity on the FM-32Ti module, see “I/O Module LEDs” on page 202.

FM-32Pi Module

Figure 111 shows the FM-32Pi module.

Figure 111: FM-32Pi module



The FM-32Pi module has 32 powered 10/100 Mpbs autonegotiating Ethernet ports using standard RJ-45 connectors. The FM-32Pi module supports autonegotitation of 10BASE-T and 100BASE-TX.

The FM-32Pi module supports power over Ethernet powered ports according to the IEEE 802.3AF specification; this module is suitable for use in intra-building applications.

NOTE

The FM-32Pi module ports must be connected within the same building.

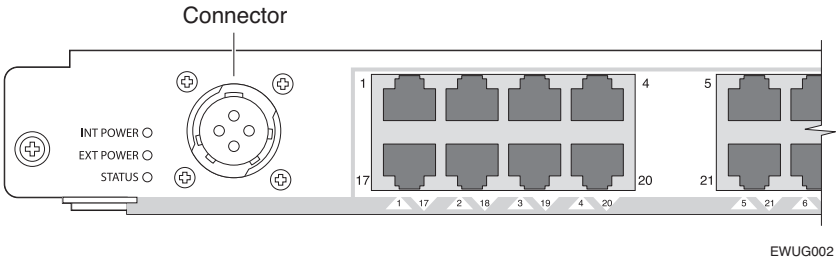
The FM-32Pi module can supply up to 32W of power from the backplane. For additional power, an external 48-volt power supply, the EPS-LD (45019), can be attached to the FM-32Pi module.

WARNING!

The EPS-LD is the only external power supply that should be used with the FM-32Pi module.

A connector on the front panel of the FM-32Pi module, shown in Figure 112, allows more ports to be powered by connecting the module to the EPS-LD. This connection requires a special external power supply cable. For more information, see “Connecting the EPS-LD to the FM-32Pi Module” on page 172.

Figure 112: Auxiliary power connector



The total power available from the ports on the FM-32Pi module is 32 watts. This will provide two ports at full power (15.4W, class 3), 4 ports at medium power (7.0W, class 2), or eight ports at low power (4.0W, class 1). There is no limitation to the number of modules installed, but ExtremeWare enforces a limit on the number of ports powered up per module and per system.

The default configuration of the FM-32Pi module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so on).
- Operate in autonegotiation mode.

When connected to the EPS-LD external power supply, the FM-32Pi module can provide 334 W for PoE devices. The total power used by all connected PoE devices must not exceed 334 W. Plan for the total load based on the maximum power use specifications provided by the PoE device manufacturer. If the power use exceeds 334 W, the EPS-LD might shut down. If the EPS-LD shuts down, disconnect the PoE devices until the EPS-LD provides power to the remaining connected ports.

LEDs

The FM-32Pi module has the following LEDs:

- Internal power
- External power
- Status

For information about the LEDs and their activity on the FM-32Pi module, see “I/O Module LEDs” on page 202.

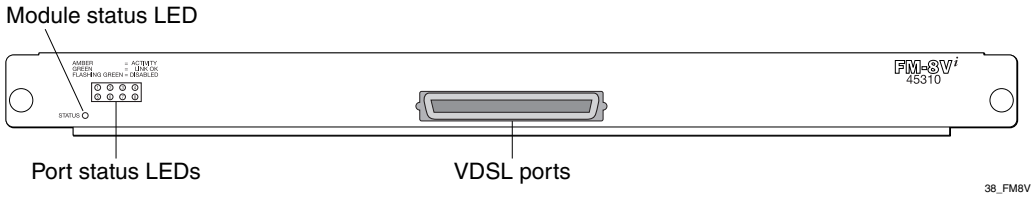
Software requirements

The FM-32Pi module requires ExtremeWare version 7.2 or later. For more information about software requirements, see the *ExtremeWare Release Notes*.

FM-8Vi Module

Figure 113 shows the FM-8Vi module.

Figure 113: FM-8Vi module



The FM-8Vi module has eight 10 Mbps VDSL ports, using one standard RJ-21 connector, and eight internal loopback ports for ingress rate-shaping. The FM-8Vi module supports 10BASE-S.

The default configuration of the FM-8Vi module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in autonegotation mode.

Connecting the FM-8Vi Module to the Mogul-100

The FM-8Vi uses a single RJ-21 connector for the eight VDSL ports on the module. The cable connector on the FM-8Vi has a Velcro™ strap to secure the connector on the cable to the module.

To deliver this VDSL connection to a subscriber, the bundle of twisted pairs that are contained in the RJ-21 cable must be separated for connection to individual Mogul-100 customer premises equipment. Typically, you connect the cable from the FM-8Vi to a punch-down block and wire the individual VDSL circuits into RJ-11 jacks for connection to the Mogul-100 units. Use the two center conductors of the RJ-11 connector to connect the wire pairs.

Your particular installation depends on the physical cabling in your building.

The connector on the FM-8Vi requires a male terminated RJ-21 cable. Specifications for this cable are listed in Table 117 on page 354. The FM-8Vi uses eight of the twenty-five pairs in the cable.

LEDs

The FM-8Vi module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the FM-8Vi module, see “I/O Module LEDs” on page 202.

Software Requirements

The FM-8Vi module requires that the SMMi has ExtremeWare version 6.1.5 or later and BootROM 6.5 or later. For more information about software requirements and module configuration, see the *ExtremeWare Release Notes Software Version 6.1.5w2.01 Rev1*. The FM-8Vi module also requires a connection to the Mogul-100. For more information about Mogul-100 configuration, see the *Mogul-100 Quick Guide*.

Configuring the FM-8Vi. The VDSL connection from the FM-8Vi to the Mogul-100 is automatically established by the hardware on the two devices. There are no commands to configure this VDSL connection.

However, the VDSL ports on the FM-8Vi connect to the Mogul-100 in such a way that the Ethernet port on the Mogul-100 behaves as though it is located on the Alpine switch. When you configure a port on the FM-8Vi, you are configuring the Ethernet port on the Mogul-100. For example, when you add port 2 on the FM-8Vi to a VLAN, the Ethernet port on the Mogul-100 connected to port 2 of the FM-8Vi now belongs to that VLAN.

The ports on the Mogul-100 that are controlled by the FM-8Vi accept configurations using the same commands and procedures as the ports on the FM-32Ti and FM-24Fi modules, except that the ports can only be configured for 10 Mbps.

The slot configuration command now includes a keyword to specify the FM-8Vi. To configure the slot for the FM-8Vi, use the following command:

```
config slot <slot> module fm8v
```

The following example configures slot 2 for the FM-8Vi module:

```
config slot 2 module fm8v
```

Displaying VDSL Statistics. For the FM-8Vi module, the show port command has been enhanced to show VDSL statistics. To display VDSL statistics, use the following command:

```
show port <portlist> vdsl stats
```

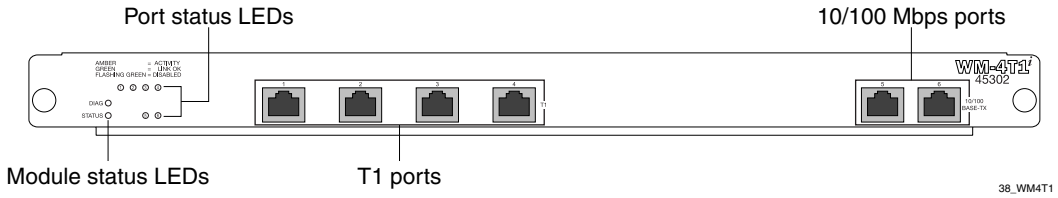
The following command displays the VDSL statistics for ports 2:1 through 2:4:

```
show port 2:1-2:4 vdsl stats
```

WM-4T1i Module

Figure 114 shows the WM-4T1i module.

Figure 114: WM-4T1i module



The WM-4T1i module has four T1 ports, using RJ-48 connectors, and two 10/100 Mbps autonegotiating Ethernet ports, using standard RJ-45 connectors. The WM-4T1i also has eight internal loopback ports that allow you to configure bi-directional rate-limiting without tying up any of the external ports for ingress rate shaping. Internal loopback ports are marked with the notation "iL" when displayed on the command line or with ExtremeWare Vista Web access. The WM-4T1i module supports T1 and autonegotiation of 10BASE-T and 100BASE-T.

The default configuration of the WM-4Ti module is as follows:

- The four T1 ports allow 1.54 Mbps.
- The other two ports in autonegotiation mode allow 10 Mbps or 100 Mbps, and full duplex or half-duplex operation.

WARNING!

To reduce the risk of fire, use only 26 AWG or larger telecommunication line cord.

You must ground the Alpine 3800 series chassis to ensure safe operation of the WM-4T1i module. For information about grounding requirements for the Alpine 3800 series chassis, see "Grounding the Alpine 3800 Series Chassis" on page 155.

LEDs

The WM-4T1i module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the WM-4T1i module, see "I/O Module LEDs" on page 202.

Software Requirements

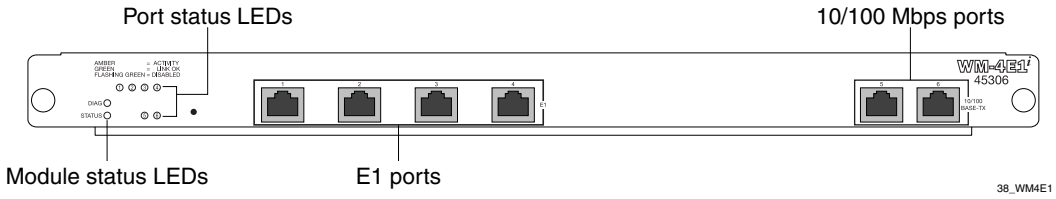
The WM-4T1i module requires ExtremeWare version 6.1.5 or later and BootROM 6.5 or later on the switch.

For more information about software requirements and WM-4T1i module configuration, see the *ExtremeWare Software User Guide* and *the ExtremeWare Command Reference Guide*.

WM-4E1i Module

Figure 115 shows the WM-4E1i module.

Figure 115: WM-4E1i module



The WM-4E1i module has four E1 ports, using RJ-48 connectors, and two 10/100 Mbps autonegotiating Ethernet ports, using standard RJ-45 connectors. The WM-4E1i also has eight internal loopback ports that allow you to configure bi-directional rate-limiting without tying up any of the external ports for ingress rate shaping. Internal loopback ports are marked with the notation "iL" when displayed on the command line or with ExtremeWare Vista Web access. The WM-4E1i module supports E1 and autonegotiation of 10BASE-T and 100BASE-T.

The default configuration of the WM-4E1i module is as follows:

- The four E1 ports allow 2.048 Mbps.
- The other two ports in autonegotiation mode allow 10 Mbps or 100 Mbps, and full duplex or half-duplex operation.

LEDs

The WM-4E1i module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the WM-4E1i module, see "I/O Module LEDs" on page 202.

Software Requirements

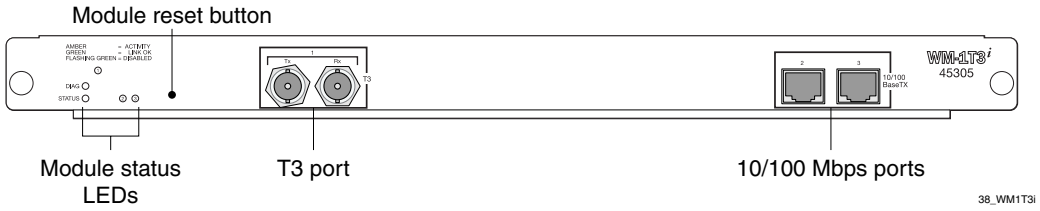
The WM-4E1i module requires ExtremeWare version 6.1.5 or later and BootROM 6.5 or later.

For more information about software requirements and WM-4E1i module configuration, see the *ExtremeWare Software User Guide* and *the ExtremeWare Command Reference Guide*.

WM-1T3i Module

Figure 116 shows the WM-1T3i module.

Figure 116: WM-1T3i module



The WM-1T3i module has one T3 port, consisting of two BNC connectors, one for the transmit path and one for the receive path. The module also has two general purpose 10/100 Ethernet ports, using standard RJ-45 connectors. The WM-1T3i also has eight internal loopback ports that allow you to configure bi-directional rate-limiting without tying up any of the external ports for ingress rate shaping. Internal loopback ports are marked with the notation “iL” when displayed on the command line or with ExtremeWare Vista Web access.

For the WM-1T3i module, use RG-59 75 ohm coaxial cable.

LEDs

The WM-1T3i module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the WM-1T3i module, see “I/O Module LEDs” on page 202.

Software Requirements

The WM-1T3i module requires ExtremeWare version 6.1.5 or later and BootROM 6.5 or later.

For more information about software requirements and WM-1T3i module configuration, see the *ExtremeWare Software User Guide* and *the ExtremeWare Command Reference Guide*.

I/O Module LEDs

Table 40 describes the LED activity on the Alpine I/O modules with the green stripe (for example, the GM-4Ti, GM-4Xi, and FM-24MFi I/O modules).

Table 40: Alpine I/O module LEDs (green stripe)

LED	Color	Indicates
Status	Green	Normal operation
	Amber	Disabled
	Off	No power

Table 40: Alpine I/O module LEDs (green stripe) (Continued)

LED	Color	Indicates
Port (all except FM-24MFi and FM-24SFi)	Green	Link up
	Flashing green	Disabled
	Amber	Packet activity
	Off	Link down
Port (FM-24MFi and FM-24SFi only)	Green	Link up
	Flashing green	Packet activity
	Off	Link down

Table 41 describes the LED activity on the Alpine Access I/O modules with the silver stripe (for example, the WM-4T1i, WM-4E1i, and WM-1T3i I/O modules).

Table 41: Alpine Access I/O module LEDs (silver stripe)

LED	Color/State	Indicates
Status	Off	No power
	Amber	Module seated in chassis
	Green	Module powered up
Diag[1]	Green blinking	Power-on Self Test (POST) is running
	Off	Normal operation
WAN port (1-4)T1/E1 (1)T3	Amber	Near-end fault has been detected (for example, no cable)
	Amber rapidly blinking[2]	Far-end fault has been detected
	Amber slowly blinking[3]	Physical link is present, but no higher-layer link (port is misconfigured or disabled)
	Green	Physical link is present, higher-layer link is established, but no traffic is present
	Alternating green and amber	Physical link is present, higher-layer link is established, and traffic is present
	Green rapidly blinking[2]	Loopback testing mode is in progress
	Green slowly blinking[3]	Port is active, but disabled
10/100 port (5,6)T1/E1 (2,3)T3	Off	No link is present
	Green	Link is present
	Alternating green and amber	Traffic is present

1 The Diag LED is on the WM-4T1i module only.
2 The rapidly blinking LEDs cycle twice a second.
3 The slowly blinking LEDs cycle once per second.

Table 42 describes the system LED activity on the Alpine PoE modules (for example, the FM32Pi I/O module). Both system and per-port LEDs are present on the module under software control.

Table 42: Alpine FM32-Pi I/O module system LEDs

LED	Color	Indicates
Status	Green	Normal operation
	Amber	No power has been applied
INT Power	Green	48V power is being supplied from the internal power supply
EXT Power	Green	48V power is being supplied from an external power supply

Table 43 describes the port LED activity on the Alpine PoE modules (for example, the FM32Pi I/O module). The per-port LEDs indicate link status and power status with the scheme shown in Table 43.

Table 43: Alpine FM32-Pi I/O module port LEDs

Single LED per port displays link and power				
	Port Disabled	**Link Up**	**Link Down**	**Activity**
Device non-powered	Slow blinking green	Green	Off	Green
Device powered	Slow blinking amber	Amber	Slow flashing amber	Amber
Power fault	Alt. - Green/Amber	Alt. - Green/Amber	Alt. - Green/Amber	Alt. - Green/Amber
Insufficient power	Alt. - Green/Amber	Green	Alt. - Green/Amber	Green

Installing I/O Modules

You can insert I/O modules at any time, without causing disruption of network services.

You need the following tools and equipment to install an I/O module:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver
- Appropriate type of cable for the I/O module you plan to install

To install an I/O module:

1 Attach the ESD strap to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.

2 Select a numbered slot for the module:

CAUTION

Do not install I/O modules into the top, unnumbered slot of the Alpine 3808 or Alpine 3804 chassis; this slot is designated for SMMi modules only. I/O modules do not fit in the top slot of the Alpine 3808 or the Alpine 3804 chassis. Forceful insertion can damage the I/O module.

3 Remove the blank faceplate from the slot to make room for the module, if necessary.

NOTE

Any unoccupied module slot in the chassis should have a blank faceplate installed to ensure satisfactory protection from EMI and to guarantee adequate airflow through the chassis.

4 Hold the module by its front panel with one hand, and place your other hand under the edge of the metal panel.

Check the connectors for dust and packing materials.

CAUTION

To prevent ESD damage, handle the module by the metal panel edges only. Never touch the components on the PCB or pins on any of the connectors.

5 Hold the module horizontal with the module name to the right, the PCB on top, and the ejector/injector levers extended.

6 Slide the module into the appropriate numbered slot of the chassis, until it makes contact with the backplane.

NOTE

Use the metal panel, not the PCB, to guide the I/O module.

As the module begins to seat in the chassis, the ejector/injector levers begin to close.

7 To close the ejector/injector levers, use both hands to push the levers toward the center of the module. Apply equal pressure to each lever.

8 Using a #2 Phillips screwdriver, tighten the two captive screws to secure the module to the chassis.

NOTE

Tighten the screws of this module before *you insert additional modules. Otherwise, you might unseat modules that you have not secured.*

9 Store the module packaging for future use.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

To install additional I/O modules, repeat steps 2 through 8.

Verifying the I/O Module Installation

After you install an I/O module, verify that it is working correctly. Check the LEDs on the I/O module and use the `show slot <slot number>` command to display slot-specific information about the newly installed module.

LEDs

When the I/O module and its ports are configured and operating normally, the front-panel LEDs should appear as follows:

- STATUS LED—green
- DIAG LED (WM-4Ti module only)—off
- Port status LED (per port):
  - Green (all modules except WM-4T1i)
  - Alternating green and amber (WM-4Ti1 module only)

If you have installed a PoE I/O module (FM-32Pi) and its ports are configured and operating normally, the LEDs should appear as follows:

- INT POWER—green
- STATUS—green

For more information about I/O module LED activity, see "I/O Module LEDs" on page 202.

Displaying Slot Status Information

Assuming the I/O module has no problems, the `show slot <slot>` command (where <*slot*> is the number of the slot where you installed the module) displays information about the module including:

- General information about the module (name, serial number, part number)
- State of the module (power down, operational, mismatch between the slot configuration and the module in the slot)
- Status of the ports on the module

For more information about slot status information, see the *ExtremeWare Software User Guide* and the *ExtremeWare Command Reference Guide*.

Installing External Power

The Extreme Networks External Power Supply 45019 (EPS-LD) provides additional power to compatible Power over Ethernet (PoE) modules and other Extreme switches. The EPS-LD provides 465 W total power with 375 W dedicated for PoE applications. See the section that describes the connected device to determine total available power to PoE ports. For detailed installation information, see "Installing the Alpine 3800 Series Switch External Power Supply" on page 171.

Removing I/O Modules

All Alpine 3800 series I/O modules are hot-swappable. You do not need to power off the system to remove a module.

You need the following tools and equipment to remove an I/O module:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver
- Replacement I/O module or blank faceplate if you are not replacing the I/O module

To remove an I/O module:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top right corner of the switch front panel.
2. Use a #2 Phillips screwdriver to unscrew the two captive screws.
3. Simultaneously rotate the ejector/injector levers away from the center of the module to disengage the module from the backplane.
4. Hold the module front panel with one hand, and place your other hand under the metal panel to support the module.

CAUTION

To prevent ESD damage, handle the module by the metal panel edges only. Never touch the components on the PCB or pins on any of the connectors.

5. Slide the module out of the chassis.
6. Immediately place the module into an antistatic sack to protect it from ESD damage and to prevent dust from collecting on the module's connectors.
7. If you are not going to install a replacement I/O module, cover the slot with a blank faceplate.

   Otherwise, follow the I/O module installation procedure on page 204.

To remove additional modules, repeat steps 2 through 6.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

11 Replacing the Alpine 3800 Series Switch Fan Tray

This chapter provides instructions for replacing the fan tray in the Alpine 3808 or Alpine 3804 switch.

The chapter includes the following topics:

- Removing the Alpine 3808 or Alpine 3804 Fan Tray on page 209
- Installing the Alpine 3808 or Alpine 3804 Fan Tray on page 211

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove any Alpine fan tray. The fan tray in the Alpine 3802 is not designed to be replaced by customers. Contact Extreme Networks if there is a fan failure in the Alpine 3802.

Removing the Alpine 3808 or Alpine 3804 Fan Tray

You do not need to turn off power to an Alpine 3808 or Alpine 3804 switch to remove a fan tray.

You need the following tools and equipment to remove a fan tray:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver
- Replacement fan tray

CAUTION

Only trained service personnel should perform service to Alpine 3800 series equipment. Before installing or removing any components, or carrying out any maintenance procedures, see Appendix A.

To remove the fan tray from the Alpine 3808 or Alpine 3804 switch:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top right corner of the switch front panel.
2. Using the # 1 Phillips screwdriver, loosen the captive screws that secure the fan tray to the chassis.
3. Use the finger grips to pull the fan tray out of the chassis approximately 1 inch (2.54 cm), as shown in Figure 117 and Figure 118; this step disconnects the power and causes the fans to stop rotating.

Figure 117: Alpine 3808 fan tray

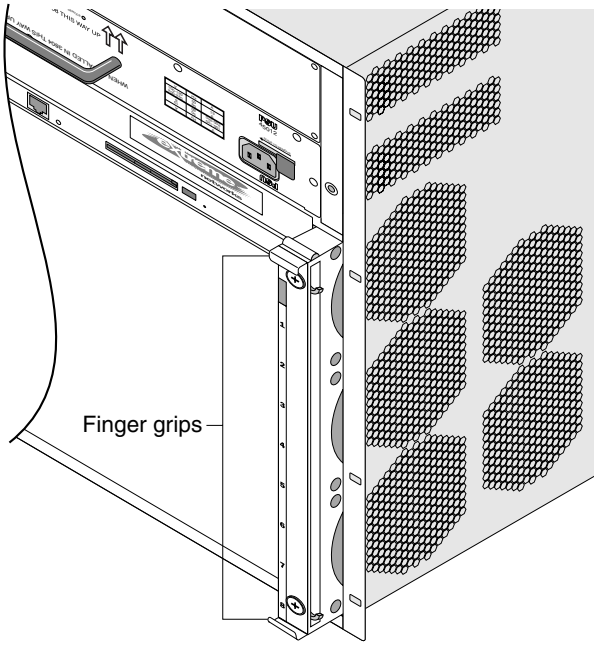
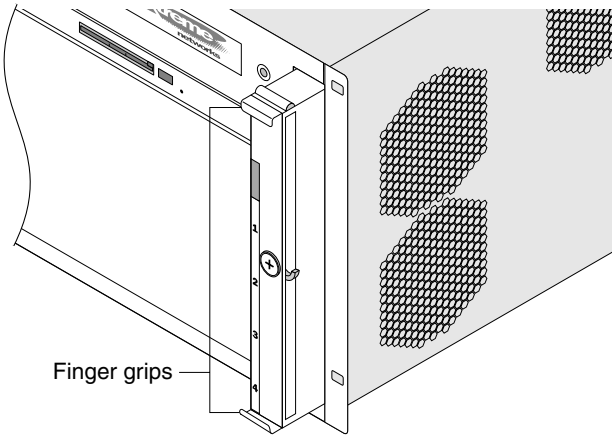


Figure 118: Alpine 3804 fan tray



4 Allow the fan blades to stop spinning before you remove the fan tray from its slot.

WARNING!

Keep your hands away from rotating fan blades.

5 Support the fan tray with one hand under the fan tray and use the other hand to pull the fan tray from its slot.

6 Immediately install a replacement fan tray, as described in “Installing the Alpine 3808 or Alpine 3804 Fan Tray” on page 211.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Installing the Alpine 3808 or Alpine 3804 Fan Tray

Alpine 3808 and Alpine 3804 fan trays are hot-swappable. You do not need to turn off power to an Alpine 3808 or Alpine 3804 switch to install a fan tray.

You need the following tools and equipment to install a fan tray:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver

CAUTION

Only trained service personnel should perform service to Alpine 3800 series equipment. Before installing or removing any components, or carrying out any maintenance procedures, see Appendix A.

To install the fan tray in the Alpine 3808 or Alpine 3804 switch:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top right corner of the switch front panel.
2. Check the connectors for dust and packing materials.
3. Support the fan tray with one hand under the fan tray, and use the other hand to guide the fan tray into the slot.

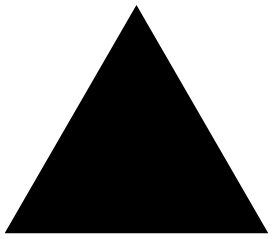
   Carefully insert the new fan tray into the slot.

   NOTE

   If the chassis is powered on, the fan blades will begin turning as soon as the tray makes contact with the backplane.

4. Using the # 1 Phillips screwdriver, align and tighten the retaining screws to secure the fan tray, to the chassis.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.



Part 5
BlackDiamond Switch

12 BlackDiamond 6800 Series Switch Overview

The BlackDiamond 6800 series switches are chassis-based switches designed to be placed in the core of your network. The BlackDiamond 6800 series switches are flexible and scalable, making it easy to meet the changing requirements of your network. Three models exist:

- BlackDiamond 6816 20-slot chassis, which can be populated with up to 16 input/output (I/O) modules and four Management Switch Fabric Modules (MSMs)
- BlackDiamond 6808 10-slot chassis, which can be populated with up to eight I/O modules and two MSMs
- BlackDiamond 6804 6-slot chassis, which can be populated with up to four I/O modules and two MSMs

This chapter includes the following topics:

- Features on page 215
- BlackDiamond 6816 Switch on page 218
- BlackDiamond 6808 Switch on page 222
- BlackDiamond 6804 Switch on page 225
- BlackDiamond Power Supplies on page 227

Features

This section describes the features of the BlackDiamond family of switches. If the information in the release notes differs from the information in this guide, follow the release notes. For more information about configuring the switch, refer to the *ExtremeWare Software User Guide* and *The ExtremeWare Command Reference Guide*.

The BlackDiamond 6816 chassis, the BlackDiamond 6808 chassis, and the BlackDiamond 6804 chassis use the same I/O modules, management modules, and power supplies, but they use different fan trays. The BlackDiamond 6816 chassis supports only modules and power supplies with an *"i"* in their name, such as the MSM64i.

The features of the BlackDiamond 6800 series switches include:

- Hot-swappable I/O modules and MSMs
- Redundant, load-sharing, hot-swappable power supplies
- Field-replaceable, hot-swappable fan tray

- Autonegotiation for half- or full-duplex operation on 10/100 Mbps ports
- Load-sharing on multiple ports
- Console (RS-232) CLI connection

Port Connections

The BlackDiamond 6800 series switches support different port configurations on the different BlackDiamond I/O modules, as described in Table 44.

CAUTION

Modules that use SX, LX, and LX70 interfaces contain Class 1 laser devices. The P3cSi, P3cMi, P12cSi, P12cMi, A3cSi, and A3cMi modules also use Class 1 laser devices. These ports can emit invisible laser radiation. Avoid direct eye exposure to the beam.

Table 44: Port configurations available on BlackDiamond I/O modules

Ethernet Ports						
Module	**10BASE-T/ 100BASE-TX**	**100BASE-T/ 1000BASE-T**	**GBIC**	**1000BASE-SX**	**100BASE-FX**	**OTHER**
G8Ti		8				
G8Xi			8			
G12SXi				12		
G16X[3]						16 Mini-GBIC[1]
G24T[3]	24[2]					
F32T	32					
F48Ti	48					
F96Ti	96					
F32Fi					32	
P3cSi						4 OC-3
P3cMi						4 OC-3
P12cSi						2 OC-12
P12cMi						2 OC-12
ARM						N/A
MPLS						N/A
A3cSi						4 OC-3
A3cMi						4 OC-3

1 The G16X[3] supports 1000BASE-X.
2 The G24T[3] supports 10/100/1000BASE-T autonegotiation.

Fans

The BlackDiamond 6816 and 6804 switches have front-accessible fan trays at the side of the chassis. The BlackDiamond 6808 switch has one fan tray that is accessed from the back of the switch. All the BlackDiamond fan trays can be hot-swapped.

ExtremeWare monitors the fan trays in the BlackDiamond 6816 switch for failure and overheat conditions. All fan failures and over temperature events cause the switch to send alerts to the network management station or to the switch log. See the *ExtremeWare Software User Guide* for more information on switch monitoring.

CAUTION

Do not cover or obstruct the fan ventilation holes at the side of the unit. Doing so can result in overheating and possible damage to the BlackDiamond switch. Thermal sensors will shut down the BlackDiamond switch if the internal temperature exceeds 60 degrees Celsius.

Switch Connectivity and the Backplane

Switch connectivity is an important aspect of the BlackDiamond 6800 series switch. The MSM is the internal switch fabric for data being sent between I/O modules. No configuration information is stored on the I/O modules; all configuration information is stored on the MSM(s).

Each MSM has two CPUs for protocol processing and network management. For full redundancy, you can install up to four MSMs in the BlackDiamond 6816 switch and up to two MSMs in the BlackDiamond 6808 and BlackDiamond 6804 switches.

The BlackDiamond 6800 series switch has a 100% passive backplane; that is, the backplane does not contain any active components that can fail. A passive backplane increases the reliability of the switch. The I/O modules treat the backplane as one logical connection and use the same load sharing (trunking) algorithm as the front facing ports to distribute the switch traffic.

There are multiple Gigabit links from the I/O modules to the MSMs, and most I/O modules have eight full-duplex Gigabit Ethernet links to the backplane that provide 16 bps full duplex bandwidth to the backplane. If one of the backplane Gigabit Ethernet links fails, ExtremeWare reroutes the switch traffic from the failed backplane Gigabit Ethernet link to another available backplane link. Moving the traffic to another available backplane link prevents disruption of switch connectivity.

With ExtremeWare 6.1 or later, you can configure the backplane load-sharing algorithm. The default load-sharing algorithm uses ingress port-based trunking. In an Internet bridging or routing environment, the address-based algorithm may be more appropriate. For more information about how to configure the backplane load-sharing algorithm, see the *ExtremeWare Software User Guide*.

Packet Switching and Routing

Each installed I/O module has Gigabit Ethernet links that attach to the backplane. The backplane divides these links equally among the MSMs that are installed in the switch. For example, if you install an F48Ti module, it has eight Gigabit Ethernet links to the switch backplane. If you have a BlackDiamond 6816 and install four MSMs, each module receives two of the eight Gigabit Ethernet links. If you have a BlackDiamond 6808 or a BlackDiamond 6804 and install two MSMs, each module receives four of the eight Gigabit Ethernet links.

BlackDiamond 6816 Switch

The BlackDiamond 6816 switch consists of the following components:

- One 20-slot chassis with backplane
- Sixteen I/O module slots, labeled slots 1 through 16
- Four MSM64i slots, labeled slots A through D
- Four power supply bays (accessed from the front of the unit)
- Two hot-swappable fan trays containing nine individual fans, accessed from the front of the switch
- Two side mounted handles for lifting the chassis
- One electrostatic discharge (ESD) wrist strap connector

NOTE

The BlackDiamond 6816 chassis supports only modules with an "i" or "3" in their name, such as the G16X³, and power supplies with an "i" in their name, such as the ipower 220 VAC.

The BlackDiamond 6816 switch can support up to the following number of ports and types of port configurations:

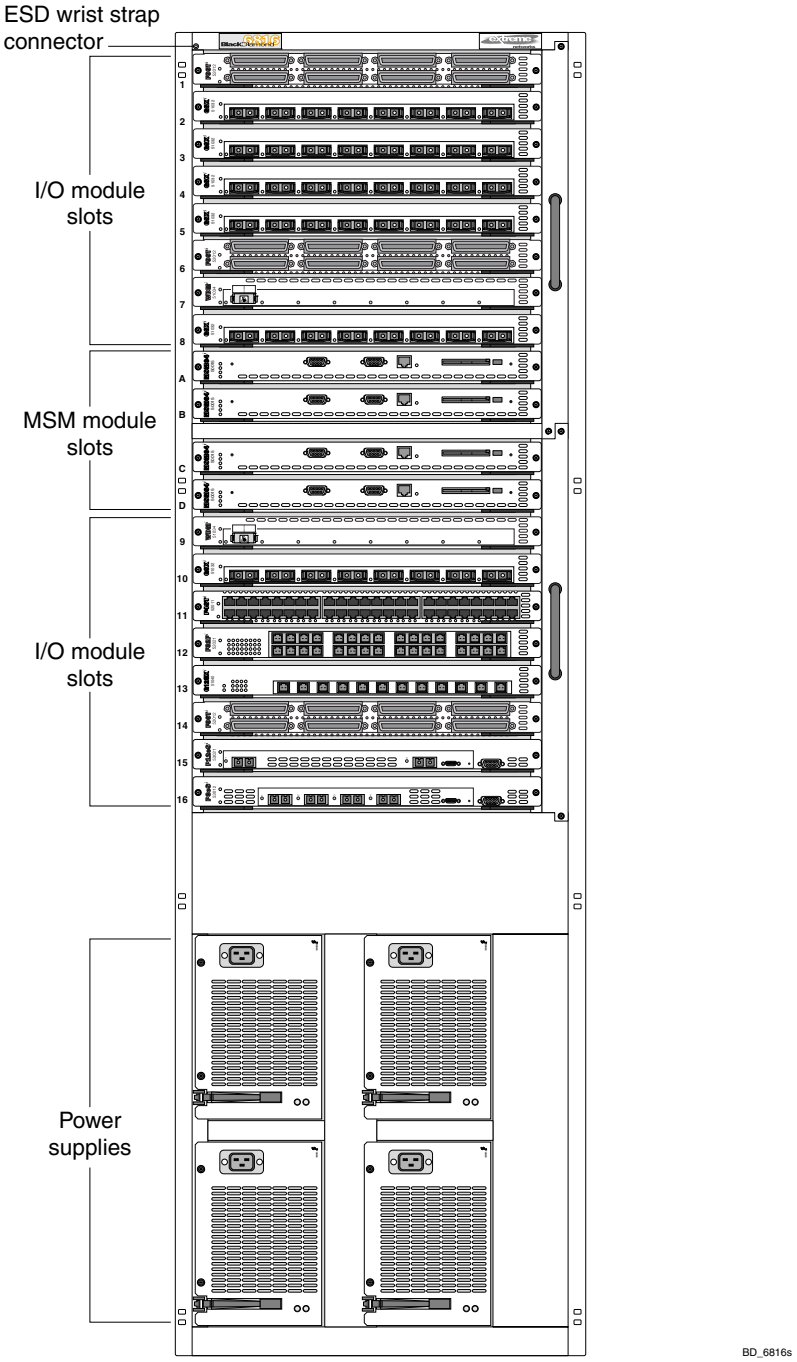
- 1344 switched 10BASE-T/100BASE-TX Ethernet ports
- 448 switched 100BASE-FX Fast Ethernet ports
- 192 switched Gigabit Ethernet ports
- 256 switched 1000BASE-X oversubscribed ports
- 360 switched 10/100/1000BASE-T oversubscribed ports
- 60 OC3 PoS ports
- 60 OC3 ATM ports
- 30 OC12 PoS ports

NOTE

PoS and ATM modules installed in a BlackDiamond chassis require at least one BlackDiamond Ethernet I/O module also installed in the chassis in order to operate correctly.

Figure 119 shows the front of the BlackDiamond 6816 chassis, fully populated with 4 MSMs and 16 I/O modules.

Figure 119: Front view of the BlackDiamond 6816 switch with typical I/O modules installed



The front of the BlackDiamond switch provides the ESD wrist strap connector, slots for installing MSMs and I/O modules, power supply bays, and access to the fan trays (Figure 120).

Figure 120: BlackDiamond 6816 fan tray

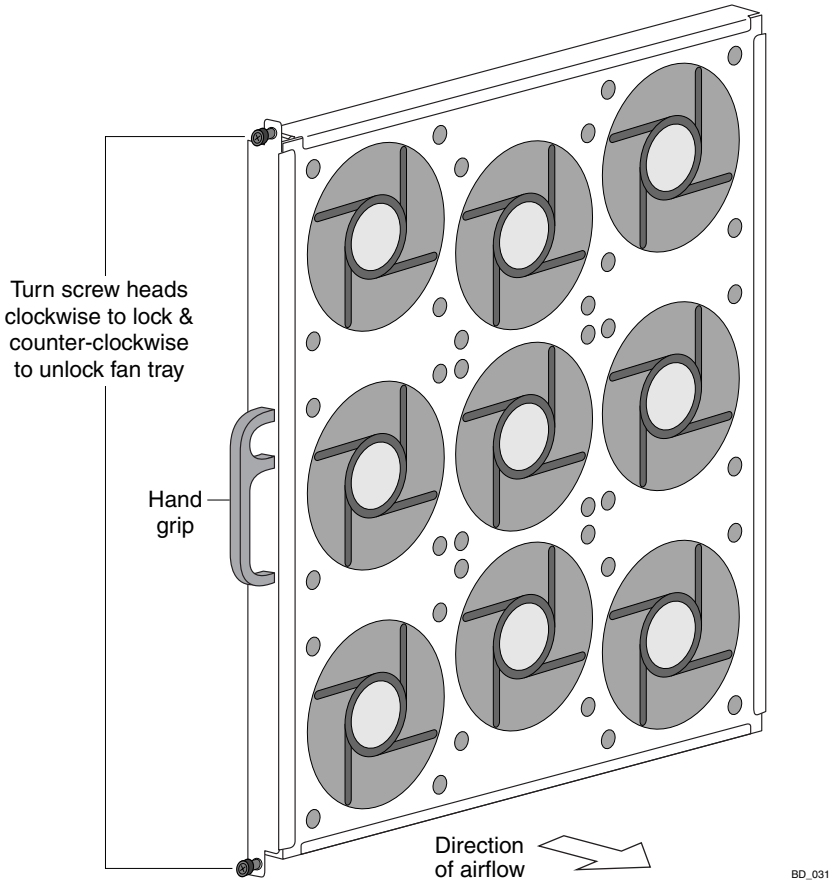
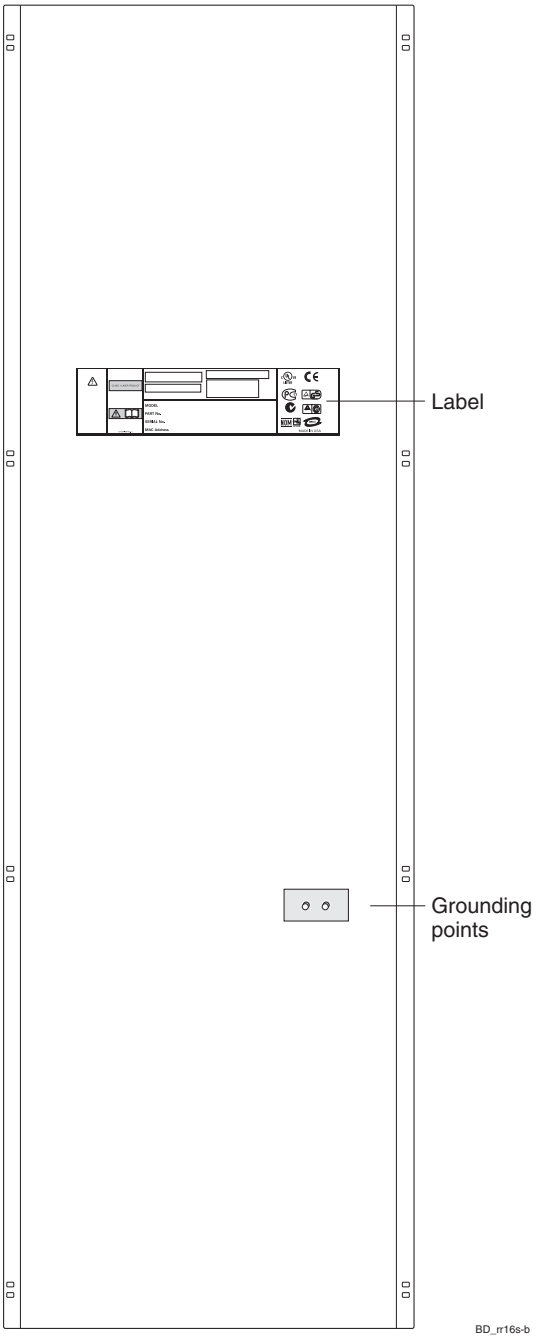


Figure 121 shows the rear panel of the BlackDiamond 6816 switch.

Figure 121: Rear panel of the BlackDiamond 6816 switch



The rear panel of the BlackDiamond 6816 switch provides:

- Chassis grounding points
- System label that includes:
  - — Chassis serial number
  - — Ethernet MAC address of the switch
  - — Symbols of safety certification

BlackDiamond 6808 Switch

The BlackDiamond 6808 switch consists of the following components:

- One 10-slot chassis with backplane
- Eight I/O module slots, labeled slots 1 through 8
- Two MSM64i slots, labeled slots A and B
- Two power supply bays (accessed from the front of the unit)
- One hot-swappable fan tray containing three individual fans, accessed from the rear of the unit
- One electrostatic discharge (ESD) wrist strap connector

The BlackDiamond 6808 switch can support up to the following number of ports and types of port configurations:

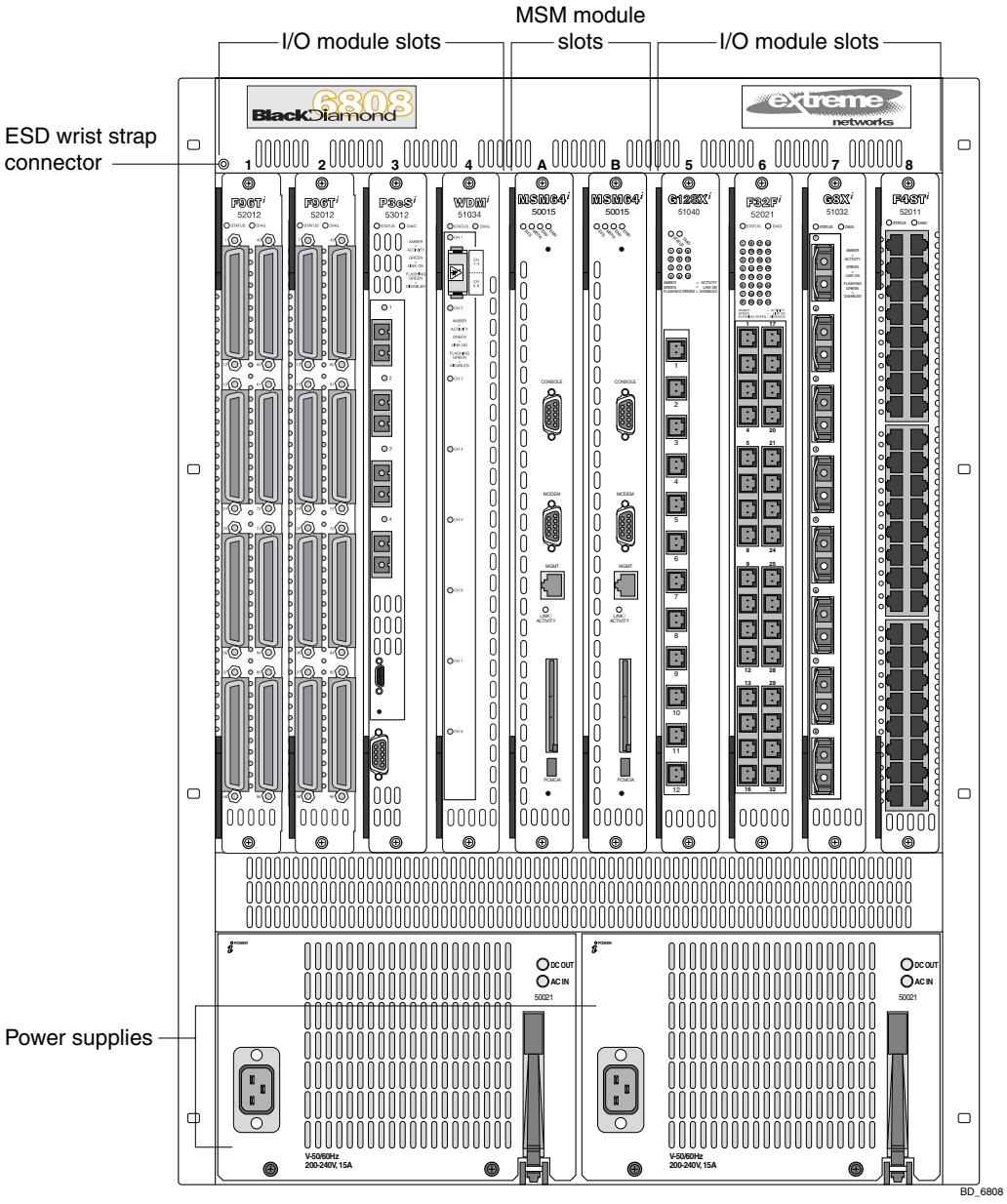
- 672 switched 10BASE-T/100BASE-TX Ethernet ports
- 224 switched 100BASE-FX Fast Ethernet ports
- 96 switched Gigabit Ethernet ports
- 128 switched 1000BASE-X oversubscribed ports
- 168 switched 10/100/1000BASE-T oversubscribed ports
- 28 OC3 PoS ports
- 28 OC3 ATM ports
- 14 OC12 PoS ports

NOTE

PoS and ATM modules installed in a BlackDiamond chassis require at least one BlackDiamond Ethernet I/O module also installed in the chassis in order to operate correctly.

Figure 122 shows the front of the BlackDiamond 6808 chassis fully populated with two MSMs and ten I/O modules.

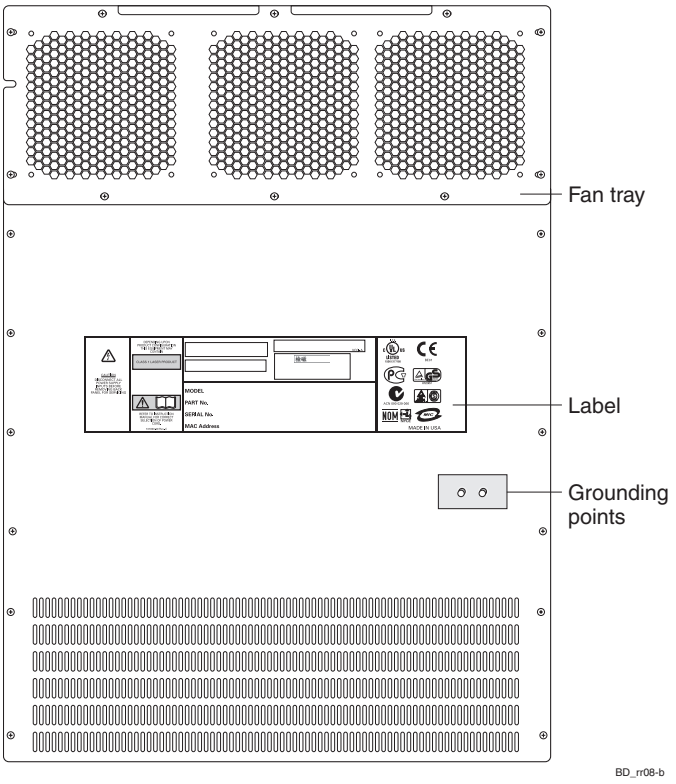
Figure 122: Front view of the BlackDiamond 6808 switch with typical I/O modules



The front of the BlackDiamond switch provides the ESD wrist strap connector, slots for installing MSMs and I/O modules, and power supply bays.

Figure 123 shows the rear panel of the BlackDiamond 6808 switch.

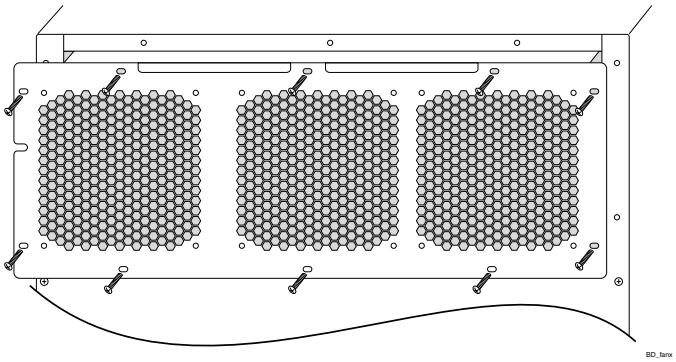
Figure 123: Rear panel of the BlackDiamond 6808 switch



The rear of the BlackDiamond 6808 switch provides:

- Access to the fan tray (Figure 124)
- Chassis grounding points
- System label that includes:
  - Chassis serial number
  - Ethernet MAC address of the switch
  - Symbols of safety certification

Figure 124: BlackDiamond 6808 fan tray



BlackDiamond 6804 Switch

The BlackDiamond 6804 switch consists of the following components:

- One 6-slot chassis with backplane
- Four I/O module slots, labeled slots 1 through 4
- Two MSM64i slots, labeled slots A and B
- Two power supply bays (accessed from the front of the unit)
- One hot-swappable fan tray containing six individual fans, accessed from the front of the unit
- One electrostatic discharge (ESD) wrist strap connector

The BlackDiamond 6804 switch can support up to the following number of ports and types of port configurations:

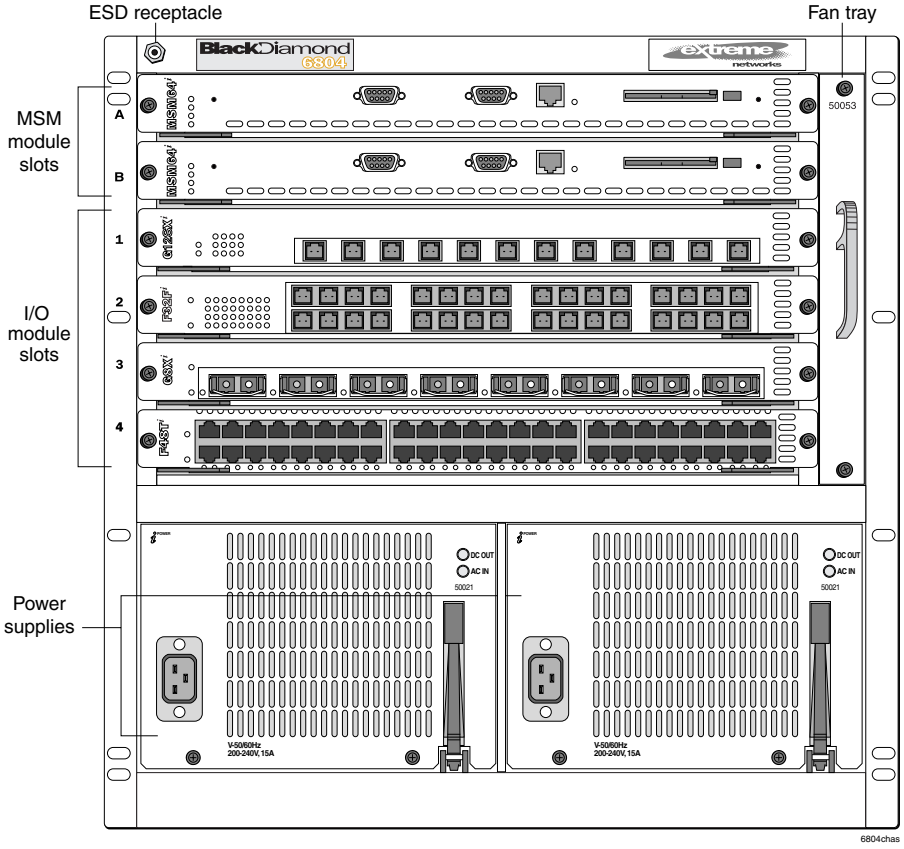
- 384 switched 10BASE-T/100BASE-TX Ethernet ports
- 128 switched 100BASE-FX Fast Ethernet ports
- 48 switched Gigabit Ethernet ports
- 64 switched 1000BASE-X oversubscribed ports
- 96 switched 10/100/1000BASE-T oversubscribed ports
- 12 OC3 PoS ports
- 12 OC3 ATM ports
- 6 OC12 PoS ports

NOTE

PoS and ATM modules installed in a BlackDiamond chassis require at least one BlackDiamond Ethernet I/O module also installed in the chassis in order to operate correctly.

Figure 125 shows the front of the BlackDiamond 6804 chassis fully populated with two MSMs and four optional I/O modules.

Figure 125: Front view of the BlackDiamond 6804 switch with sample I/O modules



The front of the BlackDiamond switch provides the ESD wrist strap connector, slots for installing MSMs and I/O modules, power supplies, and access to the fan tray (Figure 126).

Figure 126: BlackDiamond 6804 fan tray

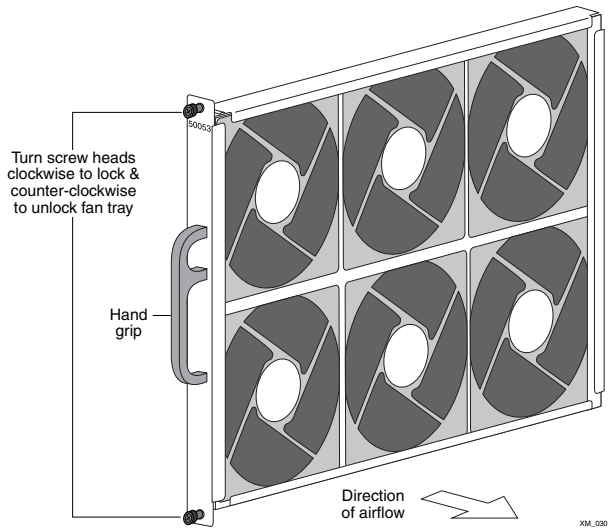
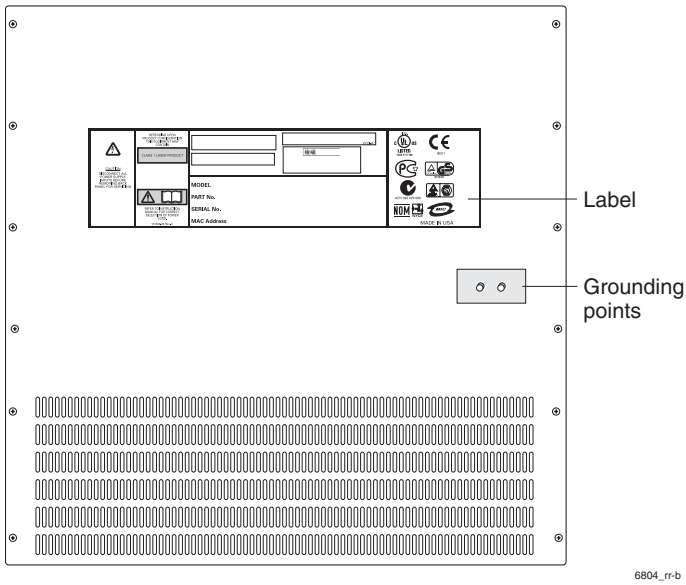


Figure 127 shows the rear panel of the BlackDiamond 6804 switch.

Figure 127: Rear panel of the BlackDiamond 6804 switch



The rear of the BlackDiamond 6804 switch provides:

- Chassis grounding points
- System label that includes:
  - Chassis serial number
  - Ethernet MAC address of the switch
  - Symbols of safety certification

BlackDiamond Power Supplies

Power supplies in the BlackDiamond switch are installed from the front of the chassis. BlackDiamond power supplies are *iPower* power supplies. Three types of power supplies are available:

- 220 VAC (200-240 VAC)
- 110 VAC (110-240 VAC)
- -48 VDC

All installed power supplies must be of the same type. You cannot mix 110 VAC, 220 VAC, and -48 VDC power supplies in a single chassis.

All BlackDiamond power supplies are fully fault-tolerant, hot-swappable, and load-sharing. Depending on the modules installed in the chassis:

- Four power supplies can support a fully loaded BlackDiamond 6816 chassis
- Two power supplies can support a fully loaded BlackDiamond 6808 chassis
- Two power supplies can support a fully loaded BlackDiamond 6804 chassis

To increase switch reliability, you can install additional power supplies as needed. If you have three or more power supplies installed in a BlackDiamond 6816 switch or two or more power supplies installed in a BlackDiamond 6808 or BlackDiamond 6804 switch, you can remove one of the power supplies without turning off power to the chassis.

Table 45 lists the minimum number of power supplies required to power a BlackDiamond 6800 series chassis.

Table 45: PSUs required to power up the chassis

Switch Model	Number of PSUs Installed
BlackDiamond 6816	2
BlackDiamond 6808	1
BlackDiamond 6804	1

NOTE

If you install four power supplies in a BlackDiamond 6816 chassis, the power supplies will deliver full redundancy.

The BlackDiamond 6800 series switch generates SNMP traps for the following events:

- AC power source fails
- Power supply fails
- Power supply is removed

For more information about planning your site and power requirements, see "Meeting Power Requirements" in Chapter 2. For more information about the specifications of the BlackDiamond 6800 series switch power supplies, see Table 84 on page 334.

220 VAC Power Supplies

If you install a 220 VAC power supply in the BlackDiamond 6800 series chassis, 220 volts of power is required for full operation. If 110VAC power is supplied, some BlackDiamond I/O modules might not power up.

The MSM performs power calculations and powers up the maximum number of I/O modules from left (slot 1) to right (slot 8) in the BlackDiamond 6808, or top (slot 1) to bottom (slot 4 in the BlackDiamond 6804 and slot 16 in the BlackDiamond 6816). A module is skipped if that module is not within the power budget. Using 110 VAC, only eight modules in the BlackDiamond 6816, four modules in the BlackDiamond 6808, and two modules in the BlackDiamond 6804 are powered on.

The BlackDiamond switch does not support installing a combination of the old 220 VAC PSUs (part number 50012) with the new iPower 220 VAC PSUs (part number 50021) in the same chassis.

The 220 VAC power supply ships with one L6-20P (locking) power cable.

220 VAC power supplies slide in from the front of the chassis, as illustrated in Figure 128.

Figure 128: 220 VAC power supplies in a BlackDiamond 6808 or a BlackDiamond 6804 switch

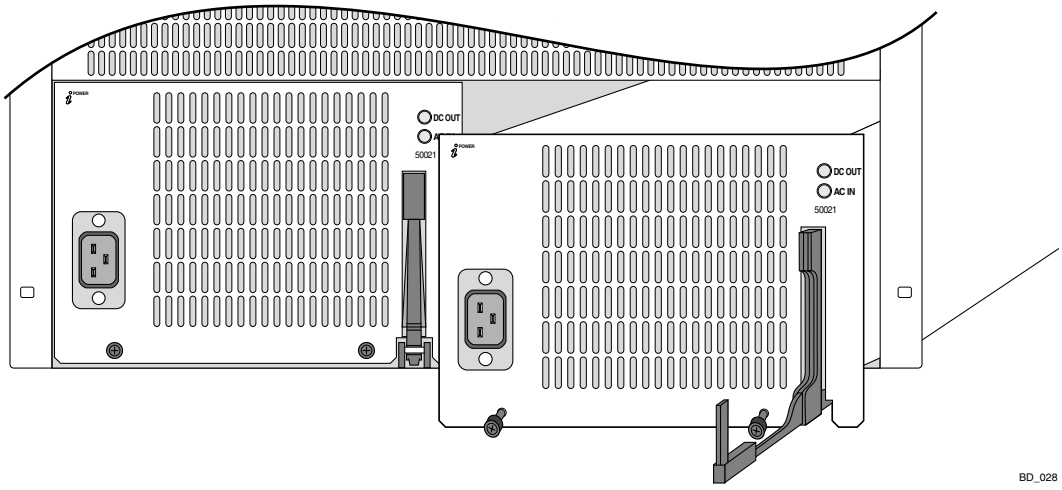


Table 46 describes the LED activity on the 220 VAC power supply

Table 46: LEDs on the 220 VAC power supply

LED	Color	Indicates
AC In	Green	Input voltage is 200-240 V
	Amber	Input voltage is less than 180 V
	Off	No input power
DC Out	Green	All DC outputs are operational
	Amber	One or more DC outputs have failed
	Off	No power

110 VAC Power Supplies

The BlackDiamond 110 VAC power supply has two IEC 320 C19 inputs on the front of the power supply. Both power cords must be connected for the power supply to operate properly, and both power cords require a dedicated 20 A 110 VAC source power connection.

The 110 VAC power supply ships with two L5-20P (locking) power cable.

Power supplies slide in from the front of the chassis, as illustrated in Figure 129.

Figure 129: 110 VAC power supplies in a BlackDiamond 6808 or a BlackDiamond 6804 switch

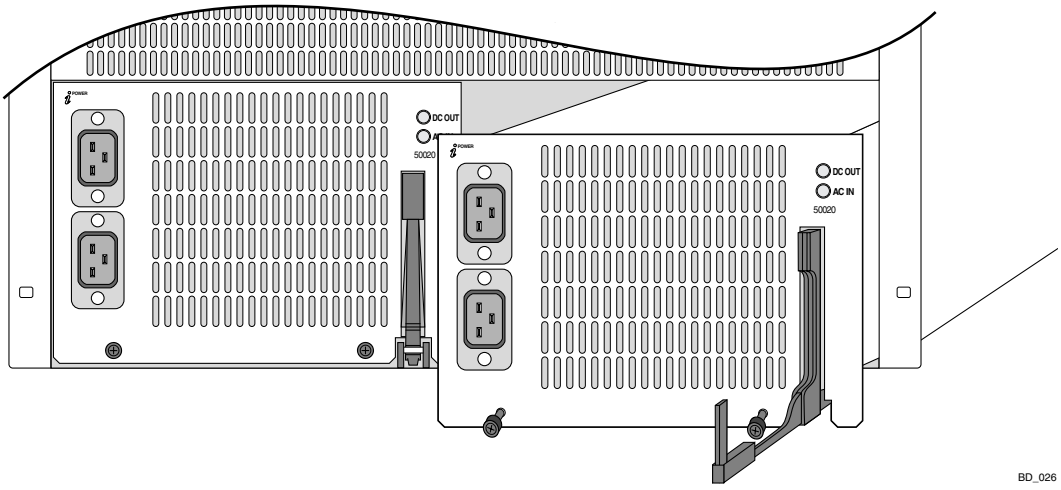


Table 47 on page 230 describes the LED activity on the 110 VAC power supply

Table 47: 110 VAC power supply LED activity

LED	Color	Indicates
AC In	Green	Powered using both inputs
	Amber	Powered using only one input, or input voltage is less than 100 V
	Off	No input power
DC Out	Green	All DC outputs are operational
	Amber	One or more DC outputs failed
	Off	No power

DC Power Supplies

The DC inputs are located on the front of the power supply. Each set of power terminals on the DC power supply consists of two 6-mm, metric-threaded, nickel-plated, brass studs that are centered 0.625 inch (15.86 mm) apart.

The earth ground studs extend 0.52 inch (13.2 mm) above the power supply faceplate; the set of positive (+) and negative (–) studs extend 0.9 inch (22.9 mm) above the faceplate. The nickel plating on the studs enhances conductivity and resists corrosion.

The input terminals are isolated from the ground terminals. The BlackDiamond DC power supplies operate with DC input that can range from -42 to -70 V. Each DC power supply requires a dedicated 60 A service.

The DC power supply ships with the input lugs attached to the power supply, and the power supplies slide in from the front of the chassis, as illustrated in Figure 130.

For centralized DC power connections, install only in a restricted access area.

Figure 130: DC power supplies in a BlackDiamond 6808 or a BlackDiamond 6804 switch

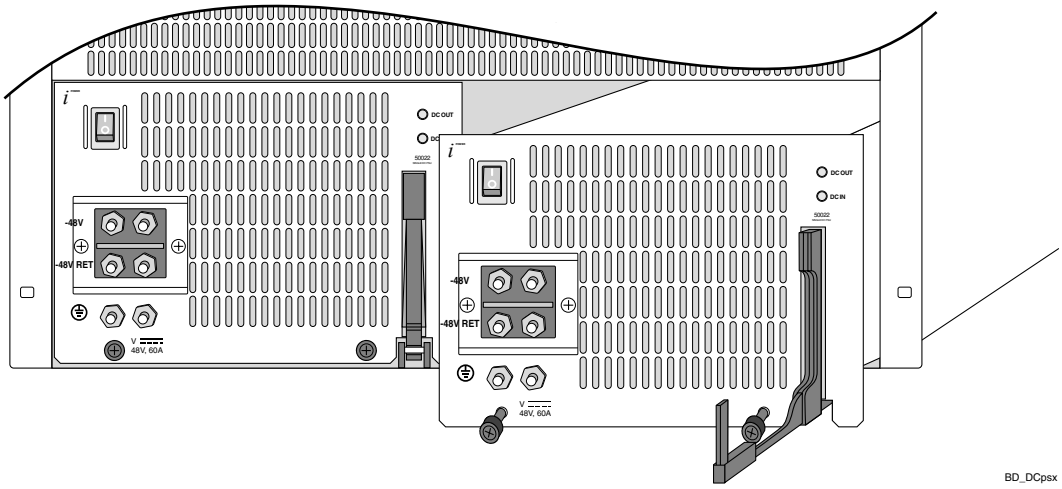


Table 48 describes the LED activity on the DC power supply

Table 48: DC power supply LED activity

LED	Color	Indicates
DC in	Green	Input voltage is within range
	Amber	Input voltage is outside of range
	Off	Input voltage is below 12 V
DC out	Green	All DC outputs are operational
	Amber	One or more DC outputs have failed
	Off	Input voltage is below 12 V

13 Installing a BlackDiamond 6800 Series Switch Chassis

This chapter includes the following topics:

- Installation Summary on page 233
- Safety Information on page 233
- Installing the Chassis on page 234
- Grounding the BlackDiamond 6800 Series Chassis on page 238
- Removing the Chassis on page 239

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove any BlackDiamond chassis.

Installation Summary

Installing a BlackDiamond 6800 Series Switch includes the following tasks:

- Install the chassis in a rack (see page 234).
- Ground the chassis (see page 238).
- Install power supplies (see Chapter 14).
- Install modules

Safety Information

WARNING!

Read the safety information in Appendix A thoroughly before installing your Extreme Networks switch. Failure to follow this safety information can lead to personal injury or damage to the equipment.

- Only trained service personnel should perform service procedures on Extreme Networks switches and components. Trained service personnel have appropriate technical training and experience

necessary to be aware of the hazards to which they are exposed in performing a task. They are aware of measures to minimize the danger to themselves or other persons.

NOTE

Electronic components are sensitive to static electricity. ESD originating from you or from objects around you can damage these components. Exercise every possible precaution to prevent ESD when working around printed circuit assemblies.

Keep all printed circuit assemblies in protective ESD-preventive sacks or place them on antistatic mats until you are ready to install them. Wear an ESD-preventive wrist strap and ensure that the leash is securely grounded before handling a bare printed circuit assembly.

- Some devices, such as I/O modules, contain fiber optic ports. To protect your eyes, you should never look at the fiber optic ports while they are on, or look directly at the fiber cable ends when they are on.

NOTE

To ensure that the system meets the NEBS GR-63-CORE Zone 4 earthquake requirements, we recommend the use of a welded steel seismic rack, such as Hendry Telephone Products (www.hendry.com) model: 0GS136.

Installing the Chassis

The BlackDiamond 6800 series chassis fits in a standard 19-inch (48.26 cm) rack. Table 49 shows the height measurements for the BlackDiamond 6800 series chassis.

Table 49: BlackDiamond 6800 series chassis height measurements

Switch Model	Height
BlackDiamond 6816	35 U
BlackDiamond 6808	15 U
BlackDiamond 6804	11 U

The BlackDiamond 6800 series chassis comes shipped with a preinstalled fan tray. The empty chassis weighs from 57 to 140 pounds, depending on the model. For your safety and to prevent damage to the equipment, Extreme Networks strongly recommends that you mount the chassis in the rack as shipped, before you install modules and power supplies. The increased weight of the chassis after components are installed can make the switch hard to maneuver.

NOTE

Mount the chassis in a rack before installing any switch components.

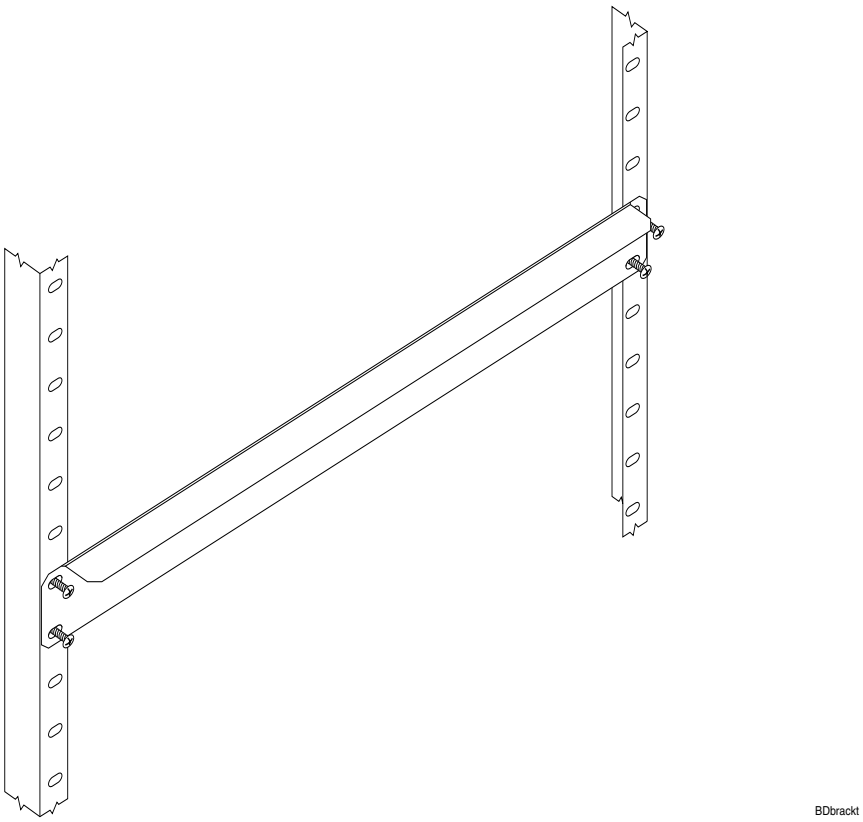
To mount the BlackDiamond 6800 series chassis in a standard 19-inch (48.26 cm) rack, you need the following tools, equipment, and resources:

- Helper bracket (provided)
- A minimum of four appropriate screws to secure the helper bracket (not provided)
- A minimum of eight appropriate screws to secure the chassis into the rack (not provided)
- # 1 Phillips screwdriver
- A minimum of two people to help install the chassis into the rack

To mount the chassis in a rack:

1 Attach the helper bracket to the rack using four appropriate screws (not provided), as shown in Figure 131.

Figure 131: Helper bracket for mounting a BlackDiamond 6800 series chassis



2 Place the chassis upright on a secure flat surface with the front of the box facing you.

3 Remove the chassis from the box, and remove the styrofoam packing material from the chassis.

To protect the interior of the chassis, the chassis comes shipped with sheet metal plates that cover the module slots and the power supply bays. Keep the sheet metal plates on the chassis while you insert the chassis into the rack.

4 Have a minimum of two people lift and place the empty chassis on the helper bracket and slowly guide the chassis into the rack.

NOTE

Do not use the fan tray handle to lift and insert the chassis into the rack.

5 While holding the empty chassis, secure it with a minimum of eight suitable screws.

- BlackDiamond 6816—see Figure 132
- BlackDiamond 6808—see Figure 133
- BlackDiamond 6804—see Figure 134

Figure 132: Securing the BlackDiamond 6816 chassis to a rack

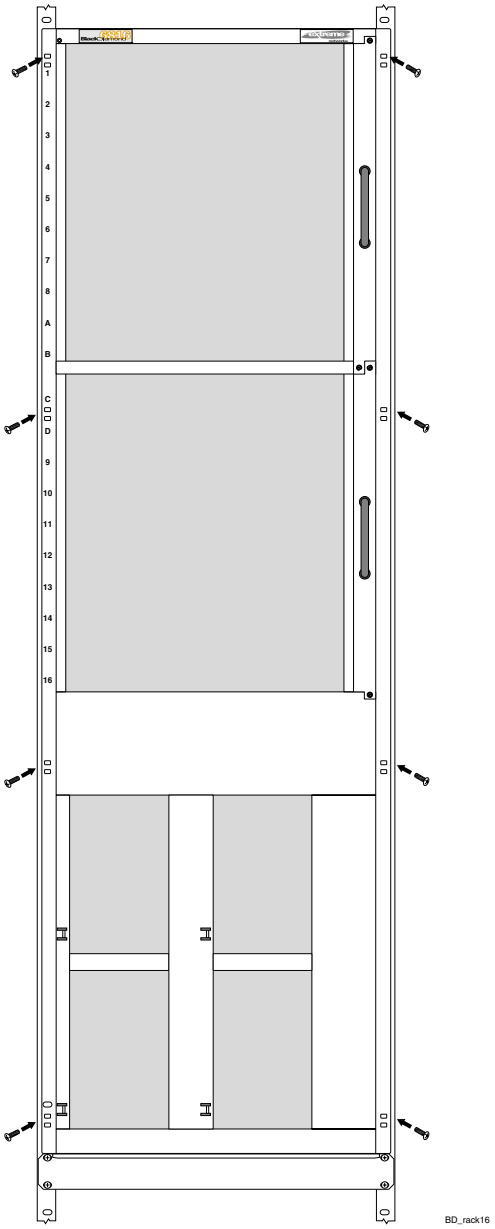


Figure 133: Securing the BlackDiamond 6808 chassis to a rack

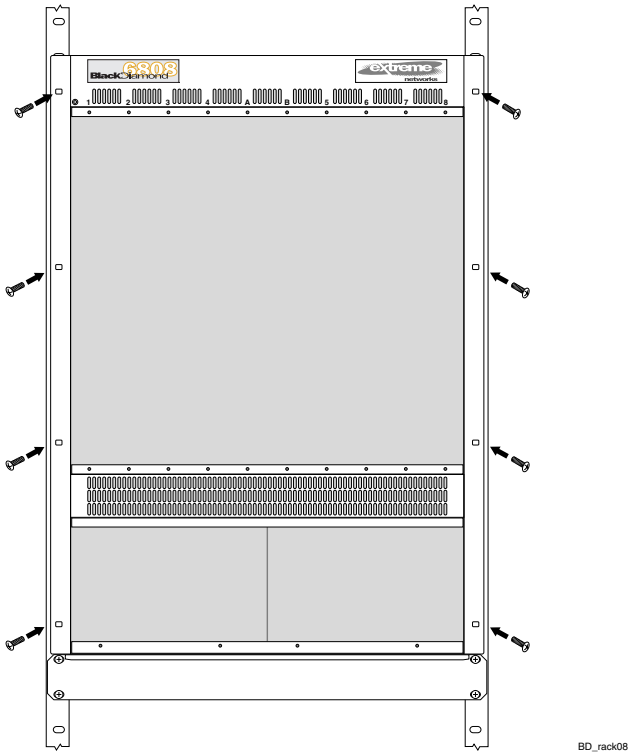
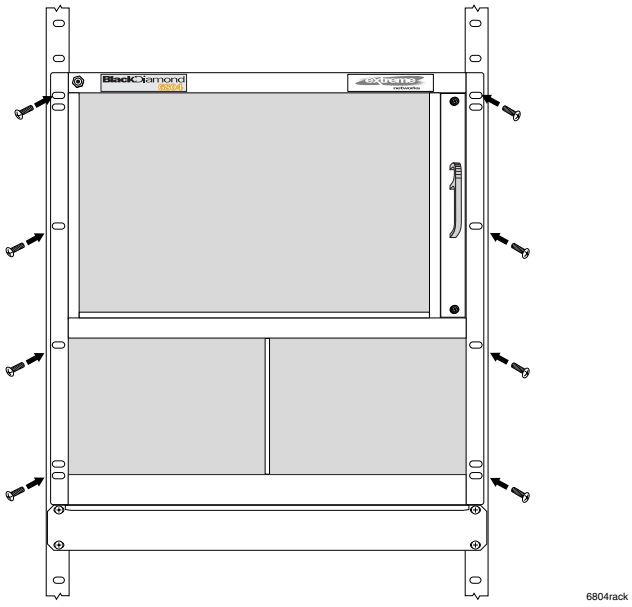


Figure 134: Securing the BlackDiamond 6804 chassis in a rack



6 After you secure the chassis, remove the helper bracket.

Store it for future use, in case you need to remove the chassis.

Grounding the BlackDiamond 6800 Series Chassis

To ground your BlackDiamond 6800 series chassis in accordance with NEBS standards, gather the following materials:

- Two 1/4-20 screws
- One copper, standard barrel 2-hole compression grounding lug, type LDC, equivalent to Panduit part number LCD4-14B-L
- Appropriate grounding wire for your system, based on the available input current for the power supply:
  - For AC systems using a 20-Amp breaker per PSU (SSI AC), the chassis ground can be as small as 14 AWG.
  - For DC systems using a 40-Amp breaker per PSU (SSI DC), the chassis ground can be as small as 10 AWG.
- Crimping tool
- Torque screwdriver

To ground the chassis:

1 Identify the grounding points on the back of the chassis.

1 Strip 0.5 inch (1.2 cm) of insulation from the stranded copper wire cable.

2 Insert the stripped wire into the cable lug.

CAUTION

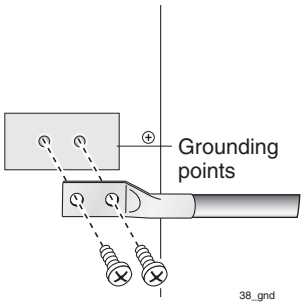
Be sure that no copper is visible between the lug and the cable insulation.

3 Crimp the lug onto the cable according to the manufacturer's specifications.

4 Insert the screws through the lug and into the grounding point on the back of the chassis (see Figure 135)

Tighten the screws to between 41 and 57 inch-pounds (between 4.63 and 6.44 Newton-meters).

Figure 135: Attaching the ground wire



5 Connect the other end of the wire to a known reliable earth ground point at your site.

Removing the Chassis

To remove the BlackDiamond 6800 series chassis from a rack, you need the following tools, equipment, and resources:

- Helper bracket (shipped originally with the chassis)
- A minimum of four appropriate screws to secure the helper bracket (not provided)
- # 1 Phillips screwdriver
- A minimum of two people to help remove the chassis from the rack

To remove the chassis from a rack:

1. Unplug the power cable from the outlet and then from the switch before you attempt to remove the chassis components and the chassis from the rack.
2. Mount the helper bracket in the rack directly beneath the chassis using four screws that are appropriate for your rack.
3. To reduce weight and prevent possible equipment damage, use a # 1 Phillips screwdriver to remove the:
   - Power supply
   - MSM(s)
   - I/O module(s)

   For information about removing power supplies, see Chapter 14.
   For information about removing the MSM, see Chapter 15.
   For information about removing I/O modules, see Chapter 16.
4. Unscrew the chassis from the rack.
5. Have a minimum of two people carefully remove the chassis from the rack and place it on a secure, flat surface.
6. Unscrew the helper bracket and remove it from the rack.

14 Installing and Connecting BlackDiamond 6800 Series Power Supplies

This chapter includes the following topics:

- Preparing for Installation on page 241
- Installing a BlackDiamond 6800 Series AC Power Supply on page 243
- Replacing a BlackDiamond 6800 Series AC Power Supply on page 246
- Installing a BlackDiamond 6800 Series DC Power Supply on page 248
- Removing a BlackDiamond 6800 Series DC Power Supply on page 251

NOTE

Read the information in this chapter thoroughly before you attempt to install, remove, or supply power to any BlackDiamond power supply.

Preparing for Installation

Complete the following tasks before installing any switch components:

- Ground the rack (see "Protective Grounding for the Rack (Alpine and BlackDiamond Switches)" on page 40).
- Mount the chassis in a rack (see "Installing the Chassis" on page 234).
- Ground the chassis (see "Grounding the BlackDiamond 6800 Series Chassis" on page 238).

You need the following tools and equipment to install the BlackDiamond 6800 series AC power supplies:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver

CAUTION

The power supply weighs approximately 30 pounds (14 kg).

When you install any power supply in a BlackDiamond 6800 series switch, orient the power supply as follows:

- For the BlackDiamond 6816 switch, as shown in Figure 136:
  - — Retaining screws to the left
  - — Locking handle at the bottom
- For the BlackDiamond 6808 or Black Diamond 6804 switch, as shown in Figure 137:
  - — Power supply right side up, with the retaining screws at the bottom
  - — Locking handle to the right

Figure 136: Orientation of the DC power supply in a BlackDiamond 6816

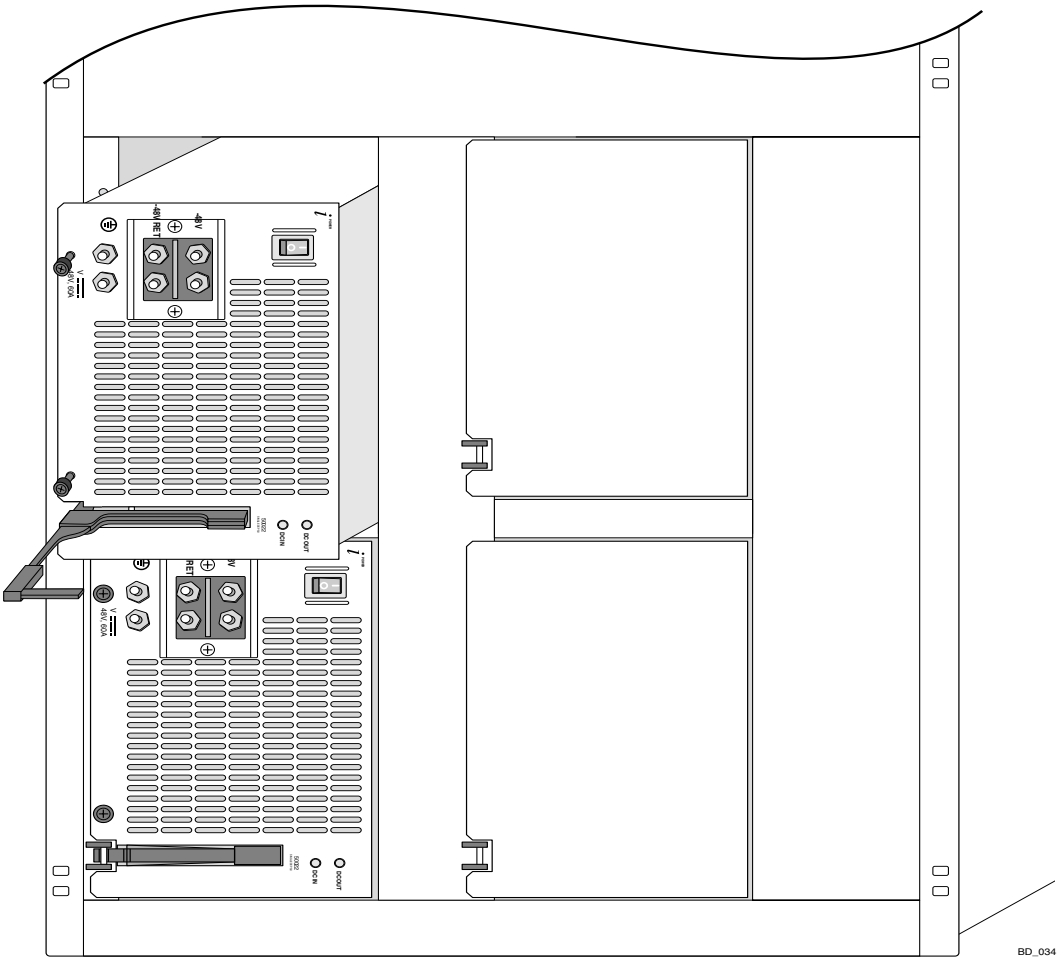
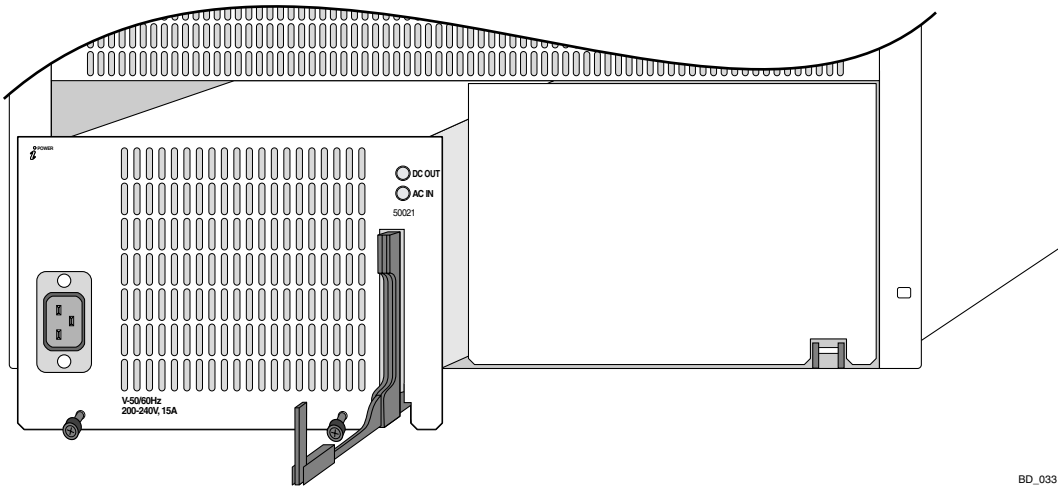


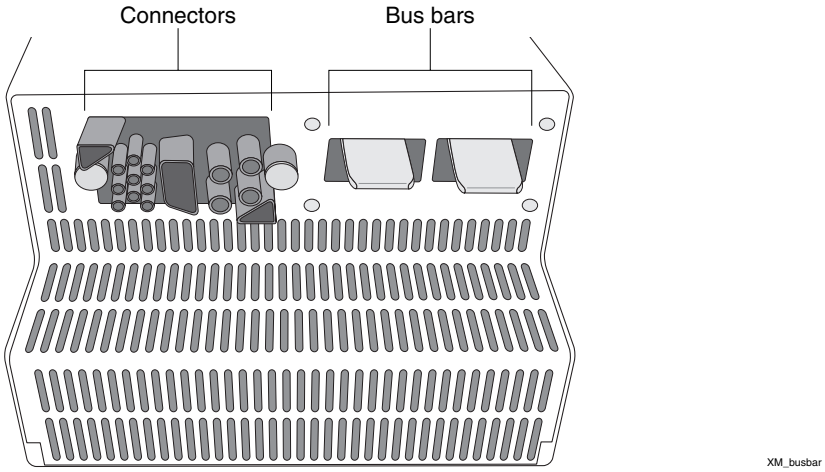
Figure 137: Orientation of the AC power supply in a BlackDiamond 6808 or a BlackDiamond 6804



CAUTION

Do not handle the power supply using the DC output bus bars. Support the power supply from the bottom, while holding the handle on the front of the power supply unit.

Figure 138: DC output bus bars and connectors on a BlackDiamond power supply



Installing a BlackDiamond 6800 Series AC Power Supply

To install a power supply:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top left corner of the switch front panel.
2. Verify that the rack and chassis are grounded to protective earth ground.
3. If a blank faceplate is covering the power supply bay, remove it and save it for future use.

4 Prepare the power supply as follows:
   a Support the power supply with both hands under the unit while you check the connectors for dust and packing materials.
   b Note the correct orientation of the power supply as noted in Figure 136 and Figure 137.
   c Open the locking handle.
5 Slowly slide the power supply into the power supply bay.

CAUTION

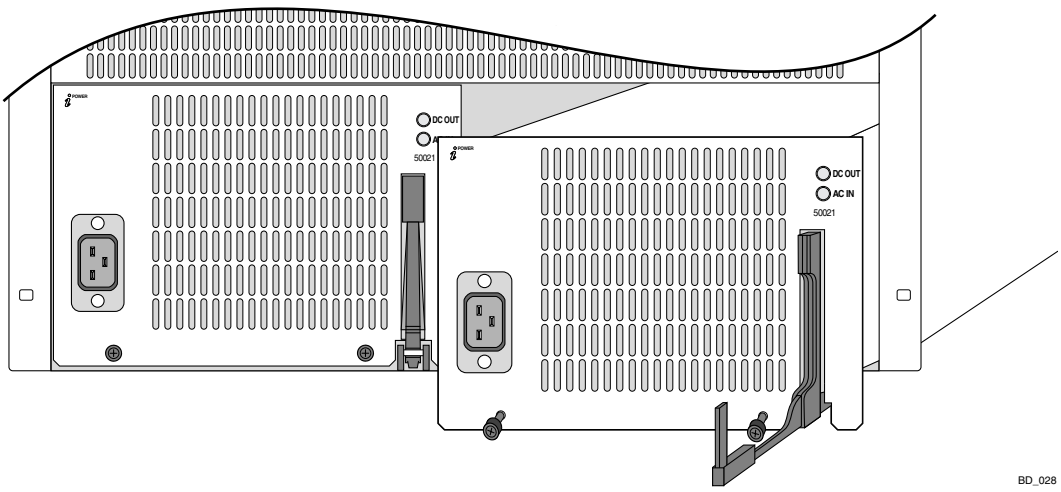
Do not slam the power supply into the backplane. Use the locking handle to secure the power supply unit into the chassis.

6 Push in on the locking handle until it clicks in place to secure the power supply.
7 Tighten the screws using a #1 Phillips screwdriver.
8 To turn on power to the system, connect the AC power cables to the power supplies and then to the wall outlet.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

To install additional power supplies, repeat steps 3 through 8.

Figure 139: Installing a second power supply in a BlackDiamond 6808 or a BlackDiamond 6804



AC Power Cable and Plug

Use the appropriate AC power cable and plug for your switch and your location. See “Wiring Closet Considerations” on page 30 for more information about the types of power cords to use.

Figure 140 shows the BlackDiamond 6800 series 220 VAC power cable and plug.

Figure 140: BlackDiamond 220 VAC power cable and plug

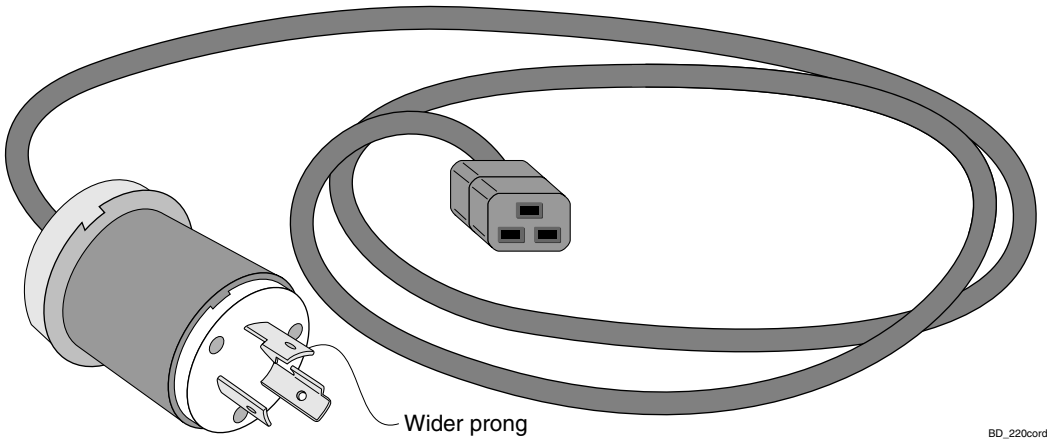
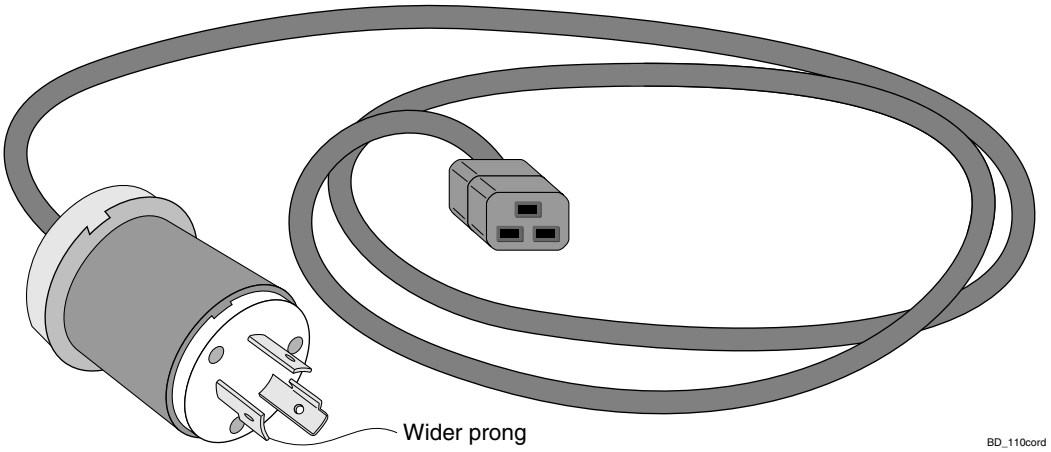


Figure 141 shows the BlackDiamond 6800 series 110 VAC power cable and plug.

Figure 141: BlackDiamond 110 VAC power cable and plug



Verifying a Successful Installation

After you supply power to the BlackDiamond switch, each MSM performs a power-on self-test (POST) of its circuitry. The LED labeled “SYS” on the MSM blinks amber during the POST. After the MSM has passed its POST and is operational, each I/O module performs its own POST.

NOTE

See Chapter 15, “BlackDiamond 6800 Series Management Switch Fabric Module” for more information about switch management module LED activity and Chapter 16, “BlackDiamond 6800 Series I/O Modules” for more information about I/O module LED activity.

Replacing a BlackDiamond 6800 Series AC Power Supply

BlackDiamond 6800 series power supplies are hot-swappable. You can add or remove power supplies without turning off power to the chassis. Normal operation will continue as long as the switch has enough power to support the installed modules.

If you have three or more power supplies installed in a BlackDiamond 6818 or two or more power supplies installed in a BlackDiamond 6808 or BlackDiamond 6804, you can remove one power supply without turning off power to the chassis.

You need the following tools and equipment to replace a BlackDiamond 6800 series power supply:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver
- Replacement power supply

To remove a 110 VAC or 220 VAC power supply:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top left corner of the switch front panel.
2. Verify that the rack and chassis are grounded to protective earth ground.
3. Disconnect the power supply cable(s) from the wall outlet and then from the power supply.
4. Unscrew the retaining screws using a #1 Phillips screwdriver.
5. Rotate the locking handle outward to disengage the power supply from the backplane.

Figure 142: Removing BlackDiamond 6816 AC power supplies

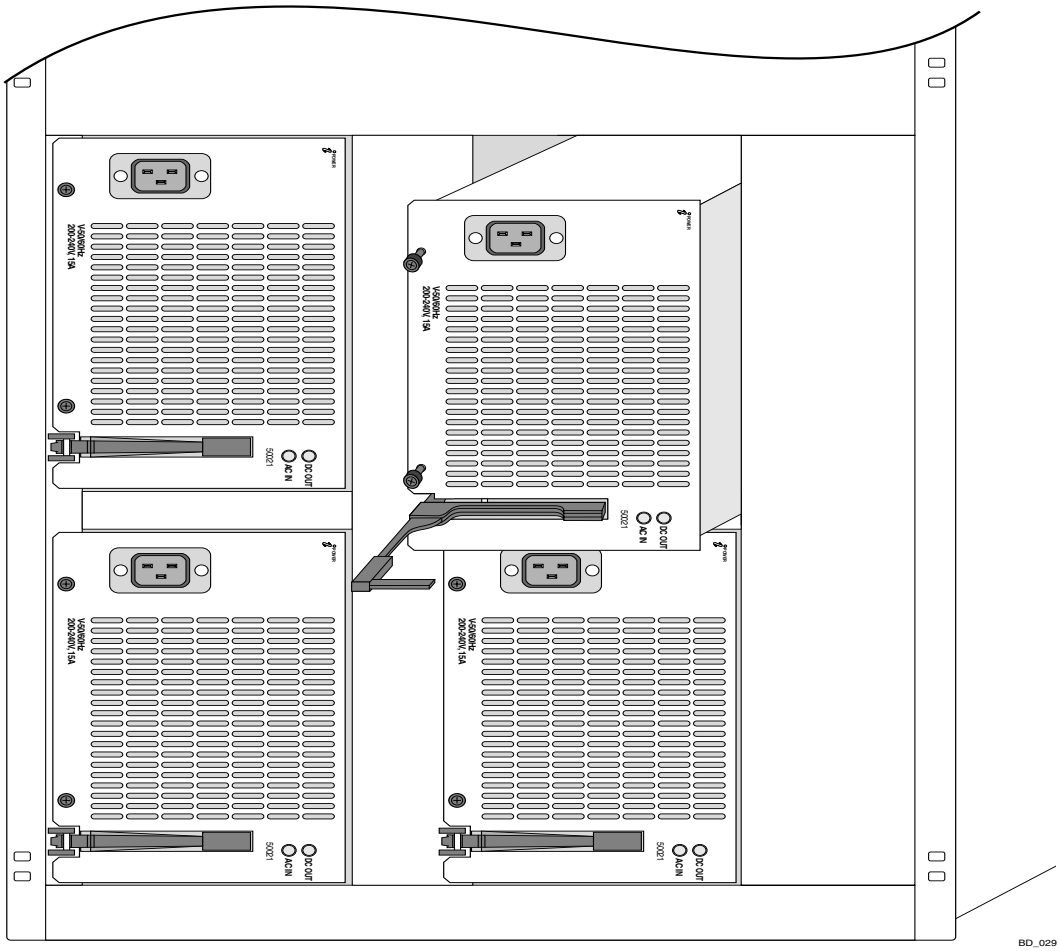
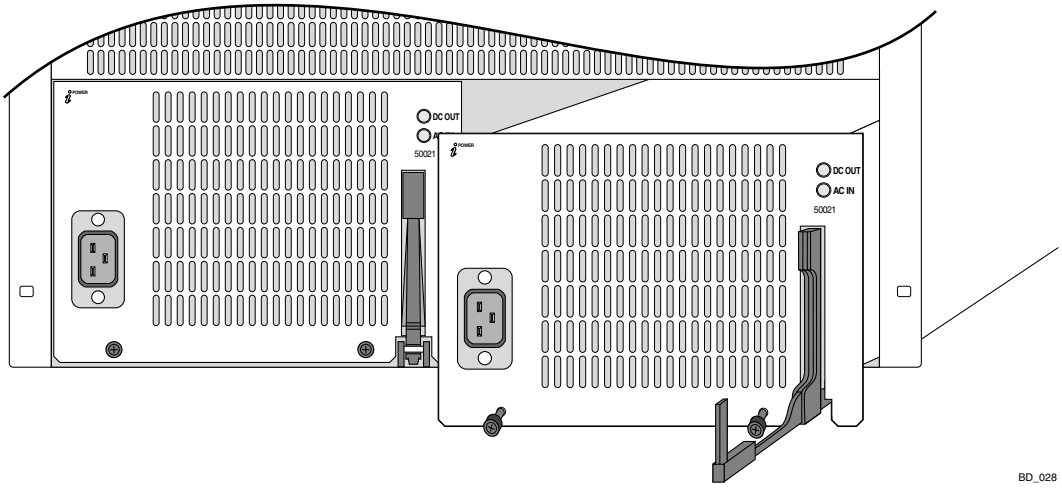


Figure 143: Removing BlackDiamond 6808 or BlackDiamond 6804 220 VAC power supplies



6 Hold the edges of the power supply with both hands and pull the power supply slowly toward you.

After you pull the power supply toward you, place both hands underneath the power supply to support it as you pull it out of the chassis.

CAUTION

The power supply weighs approximately 30 pounds (14 kg).

CAUTION

Do not handle the power supply using the DC output bus bars.

Install a replacement power supply following the instructions in "Installing a BlackDiamond 6800 Series AC Power Supply" on page 243.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Installing a BlackDiamond 6800 Series DC Power Supply

Before installing the DC power supply, you must select appropriate DC cabling and attach the connection lugs.

Selecting and Preparing the DC Cabling

Use the following guidelines when selecting cabling for the DC power supplies:

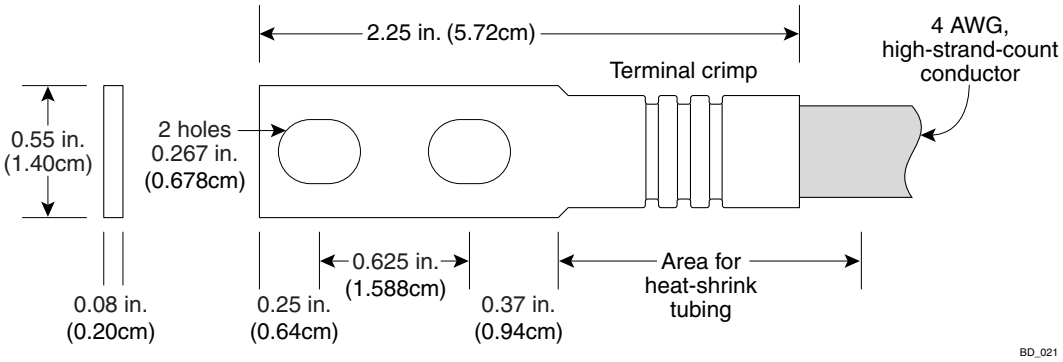
- Each DC power supply requires a dedicated fuse or circuit breaker of 75 A minimum and 100 A maximum.
- For DC power cables, use 4 AWG, high-strand-count copper wire cable.

For convenience, the necessary connection lugs used to connect the source DC cables to the power terminals are loosely mounted on the studs of the DC power supply. using lock washers and nuts. Figure 144 shows the specifications of the lugs. They are designed to fit over M6 (metric) terminals that are centered 0.625 inch (15.86 mm) apart.

NOTE

Add a length of heat-shrink tubing to prevent the crimp area on the lug from coming into contact with the metal faceplate of the DC power supply.

Figure 144: Dimensions of the DC power cable lugs



Use power cables and lugs with the specifications outlined in Table 50.

Table 50: Source DC power specifications

Characteristic	Specification
DC power cable size	4 AWG, high strand-count copper wire
DC power cable lug	Panduit copper, standard barrel, 2-hole lug—Type LDC (Thomas & Betts part number 32005)
Power	1800 W, -42 to -70 VDC

Attaching the Cable to the Lugs

To attach the cable to the lugs, perform the following steps:

1 Strip 0.5 inches of insulation from the 4 AWG, high strand-count copper wire cable.

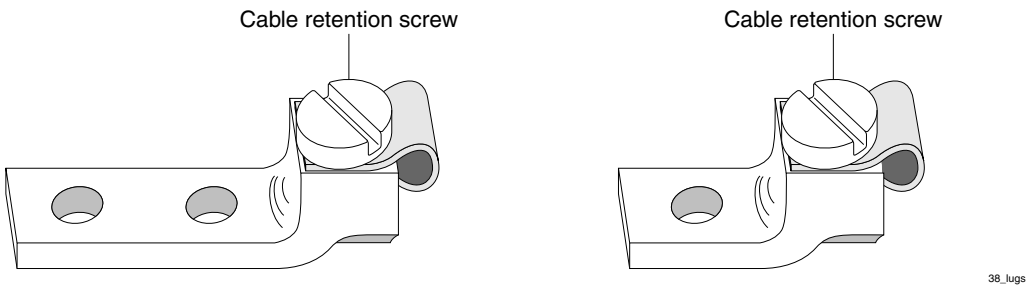
2 Insert the cable into the cable lugs.

CAUTION

Ensure that no copper is visible between the lug and the cable insulation

3 Tighten the retaining screw on each to 1.49 foot-pounds (2.02 Newton meters).

Figure 145: Power and ground cable lugs



Each set of power terminals on the DC power supply consists of two 6-mm, metric-threaded, nickel-plated, brass studs centered 0.625 inch apart. The earth ground studs extend 0.52 inch (13.2 mm)

above the power supply faceplate; the set of positive (+) and negative (–) studs extend 0.9 inch (22.9 mm) above the faceplate. The nickel plating on the studs enhances conductivity and resists corrosion.

Installing the Power Supply

To install the power supply:

1 Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top left corner of the switch front panel.

2 Ensure that the rack and chassis are grounded to protective earth ground.

For more information about grounding the rack, see "Protective Grounding for the Rack (Alpine and BlackDiamond Switches)" on page 40. For more information about grounding the chassis, see "Grounding the BlackDiamond 6800 Series Chassis" on page 238.

3 If a blank faceplate is covering the power supply bay, remove it and save it for future use.

4 Prepare the power supply for installation as follows:

- **a** Support the power supply with both hands under the unit while you check the connectors for dust and packing materials.
- **b** Note the correct orientation of the power supply as noted in Figure 136 and Figure 137.
- **c** Open the locking handle.

5 Carefully slide the power supply into the power supply bay.

CAUTION

Do not slam the power supply into the backplane. Use the locking handle to secure the power supply unit into the chassis.

6 Push in on the locking handle until it clicks in place to secure the power supply.

7 Tighten the screws using a #1 Phillips screwdriver.

8 Connect the DC power cables as follows:

- **a** Verify that the DC power is turned off at the source.
- **b** Remove the plexiglass cover over the connection terminal block.
- **c** Secure the connection lugs to the studs using the provided lock washers and nuts.
- **d** Replace the plexiglass cover.

9 Turn on the DC power at the source

10 Turn the on/off switch to the on position.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

To install additional power supplies, repeat steps 3 through 10.

Verifying a Successful Installation

After you supply power to the BlackDiamond switch, each MSM performs a POST of its circuitry. The LED labeled "SYS" on the MSM blinks amber during the POST. After the MSM has passed its POST and is operational, each I/O module performs its own POST.

NOTE

See Chapter 15, "BlackDiamond 6800 Series Management Switch Fabric Module" for more information about switch management module LED activity and Chapter 16, "BlackDiamond 6800 Series I/O Modules" for more information about I/O module LED activity.

Removing a BlackDiamond 6800 Series DC Power Supply

BlackDiamond 6800 series power supplies are hot-swappable. You can add or remove power supplies without turning off power to the chassis and normal operation will continue as long as the switch has enough power to support the installed modules.

If you have three or more power supplies installed in a BlackDiamond 6818 or two or more power supplies installed in a BlackDiamond 6808 or BlackDiamond 6804, you can remove one of them without turning off power to the chassis.

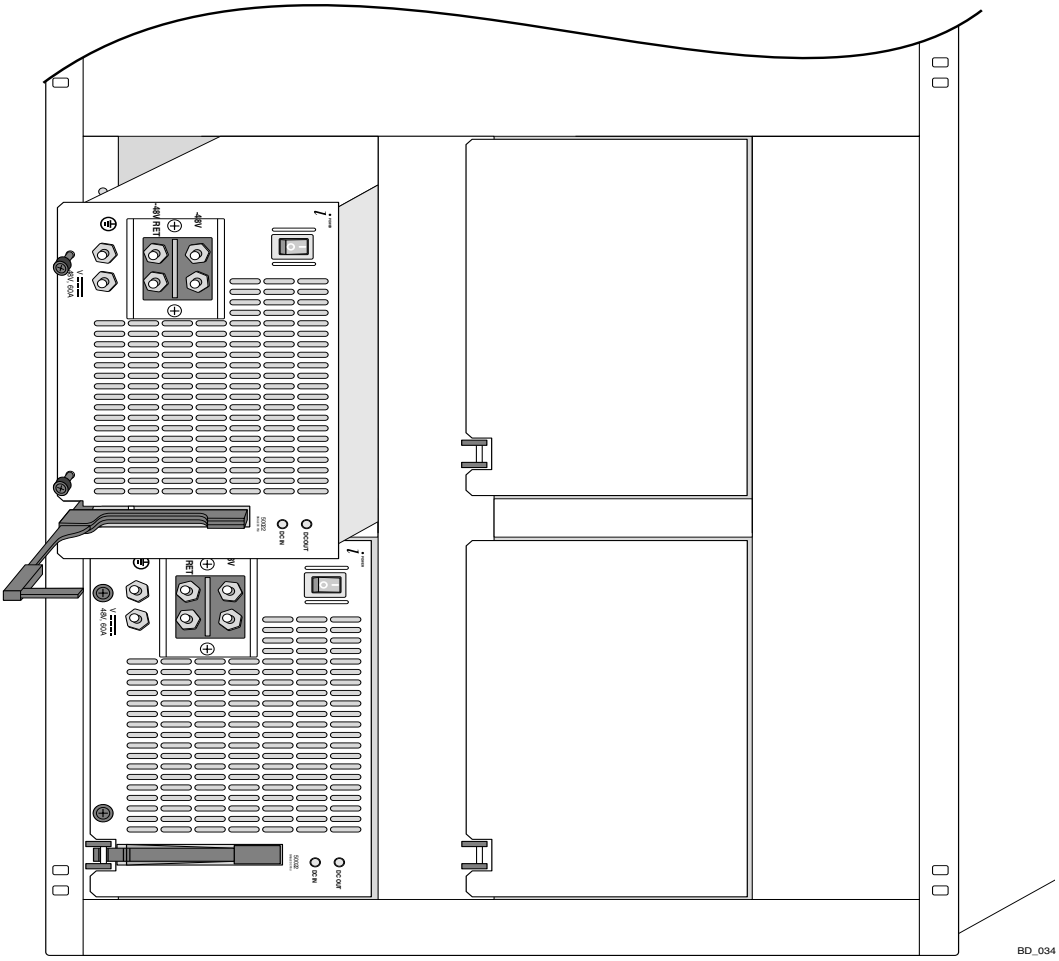
You need the following tools and equipment to remove the BlackDiamond 6800 series power supplies:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver
- Replacement power supply

To remove a -48 VDC power supply:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top left corner of the switch front panel.
2. Verify that the rack and chassis are grounded to protective earth ground.
3. Turn the on/off switch to the off position.
4. Turn off the DC supply at the source breaker.
5. Remove the plexiglass cover over the connection terminal block.
6. Disconnect the power cables as follows:
   a. Remove the nuts and lock washers holding the cable lug to the studs.
   b. Pull the cable lug off the studs.
7. Replace the plexiglass cover.
8. Unscrew the retaining screws using a #1 Phillips screwdriver.
9. Rotate the handle outward to disengage the power supply from the backplane. as shown in Figure 146.

Figure 146: Removing BlackDiamond 6816 DC power supplies



10 Hold the edges of the power supply with both hands and slowly pull the power supply toward you.

After you pull the power supply toward you, place both hands underneath the power supply to support it as you pull it out of the chassis.

CAUTION

The power supply weighs approximately 30 pounds (14 kg).

CAUTION

Do not handle the power supply using the DC output bus bars.

Install a replacement power supply following the instructions in "Installing a BlackDiamond 6800 Series DC Power Supply" on page 248.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

15 BlackDiamond 6800 Series Management Switch Fabric Module

This chapter Includes the following topics:

- Overview of the BlackDiamond Management Switch Fabric Module on page 253
- Installing MSMs on page 257
- Replacing MSMs on page 260

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove the BlackDiamond Management Switch Fabric Module (MSM).

Overview of the BlackDiamond Management Switch Fabric Module

The Management Switch Fabric Module (MSM) is the internal switch fabric for data being sent between I/O modules. One MSM is required for switch operation; however, adding more MSMs increases both reliability and throughput.

Each MSM has two CPUs for protocol processing and network management. For full redundancy, you can install MSMs as follows:

- Four MSMs in the BlackDiamond 6816 switch
- Two MSMs in the BlackDiamond 6808 switch
- Two MSMs in the BlackDiamond 6804 switch

With full redundancy, the BlackDiamond 6800 series switch is a fully nonblocking switch.

Table 51 shows how packet throughput between I/O modules increases when additional MSMs are installed.

Table 51: Packet throughput between I/O modules

Chassis	# of MSMs	Throughput
BlackDiamond 6816	1	64 Gbps
	2	128 Gbps
	3	192 Gbps
	4	256 Gbps
BlackDiamond 6808	1	64 Gbps
	2	128 Gbps
BlackDiamond 6804	1	32 Gbps
	2	64 Gbps

Install an MSM in any lettered slot in the BlackDiamond 6800 series chassis:

- BlackDiamond 6816—Slots labeled A, B, C, or D
- BlackDiamond 6808—Slots labeled A or B
- BlackDiamond 6804—Slots labeled A or B

Figure 147 shows the front view of the MSM64i.

Figure 147: MSM64i Module

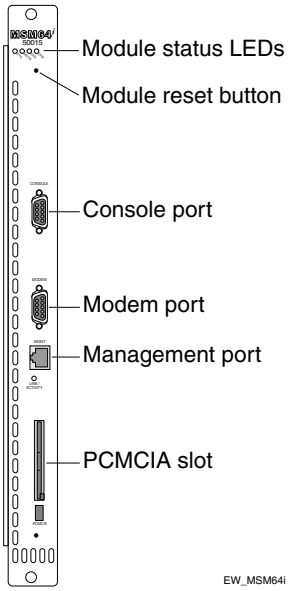
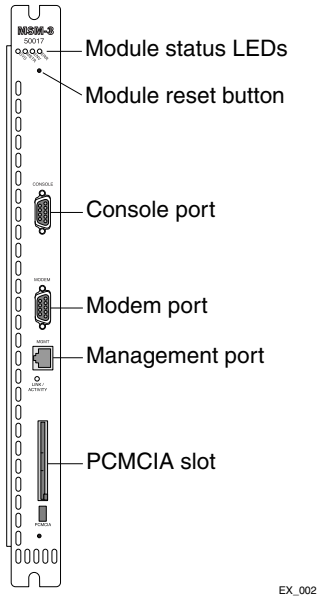


Figure 148 shows the front view of the MSM-3.

Figure 148: MSM-3 Module



The MSM-3 module allows cross-module trunking on the BlackDiamond 6804 and 6808 chassis. Cross-module trunking is the ability for a load-share group to span multiple modules. Load-sharing groups are still limited to a maximum of eight ports, but the ports can be located on any number of different modules. For more information about cross-module trunking, see the *ExtremeWare Software User Guide*.

The MSM consists of a printed circuit board mounted on a metal panel that acts as the insertion vehicle in a BlackDiamond 6800 series switch. The module carrier also includes ejector/injector levers and captive retaining screws at each end of the module front panel.

Each MSM has the following ports:

- Console port—Used to connect a terminal and perform local management.
- Management port—Used to connect an Ethernet cable directly from your laptop into the management port to view and locally manage the switch configurations.
- Modem port—Used to connect a modem for remote access to the CLI.
- PCMCIA slot—Reserved for future use.

See Chapter 1, "Common Switch Features" for more information about management ports. For information about BlackDiamond MSM module specifications, see Appendix C, "Module Technical Specifications."

MSM Activity

The BlackDiamond 6800 series switch can run with a single MSM installed. When you install additional MSMs, one of the MSMs operates as the *master*, and the others become the *slaves*.

The master MSM is responsible for upper-layer protocol processing and system management functions. For example, OSPF computation and SNMP functions are performed by the master MSM. Packet handling is distributed among the CPUs of all installed MSMs.

When you save the switch configuration, it is saved to all MSMs. If you download a new ExtremeWare image, the image is downloaded to all MSMs.

Selection of the master MSM occurs automatically. The following scenarios describe the selection process:

- When the BlackDiamond 6800 series switch boots with one or more MSMs already installed, and an MSM module is installed in slot A, the MSM in slot A becomes the master.
- When the BlackDiamond 6800 series switch boots with a single MSM (regardless of the slot position), it is selected as the master.

  If additional MSMs are added to the switch after powered on, the added MSMs become the slaves. MSMs that operate as slaves can be inserted and removed without disrupting network services.
- If you remove the master MSM while the BlackDiamond 6800 series switch is operating, the slave MSM experiences a soft reset and then becomes the master MSM.

  For example, if you have a BlackDiamond 6816 switch with a master MSM in slot A and slave MSMs in slots B through D, and you remove the master MSM from slot A, the slave in slot B becomes the master.

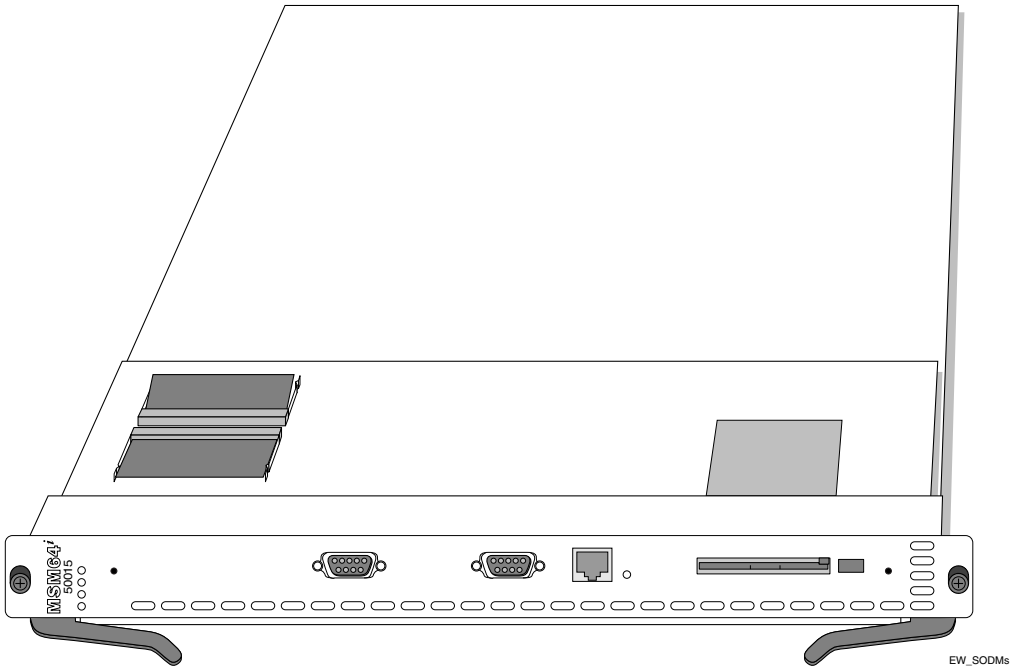
MSM Memory

The MSM has two 144-pin SODIMM sockets and is shipped with two 128 MB SODRAM modules installed, as shown in Figure 149.

NOTE

The MSM supports only SODIMMs supplied by Extreme Networks.

Figure 149: MSM SODIMM sockets



MSM LEDs

Table 52 describes the LED activity on the MSM.

Table 52: MSM LEDs

LED	Color	Indicates
SYS	Green blinking	Normal operation is occurring
	Amber blinking	Diagnostic test is in progress
	Amber	Diagnostic failure has occurred
	Off	Switch is not receiving power
MSTR	Green	Module is operating as master
	Amber	Module is operating as slave
ENV	Green	Environment (temperature, fan, power supply) is operating properly
	Amber	Environmental failure has occurred
ERR	Amber	A critical software error has been logged since power up
	Off	Normal operation is occurring
Link/Activity	Off	Link is down
	Green	Link is up
	Amber	Packet activity is occurring

NOTE

To reset the critical software error LED (amber ERR LED), use the `clear log static` *command and reboot the switch. If you continue to have critical software errors, or the ERR LED is amber after the* `clear log static` *command and a switch reboot, contact Extreme Networks Customer Support.*

Installing MSMs

The BlackDiamond MSM is hot-swappable. You do not need to power off the system to insert an MSM.

You need the following tools and equipment to install an MSM:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver

To install the MSM:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top left corner of the switch front panel.
2. Select a slot for the module:
   - Slots A through D in the BlackDiamond 6816
   - Slots A through B in the BlackDiamond 6808 and BlackDiamond 6804

CAUTION

You can install MSMs in lettered slots only. MSMs do not fit in numbered slots. Forceful insertion can damage the MSM module.

3 Remove the blank faceplate from the slot to make room for the module, if necessary.

NOTE

Any unoccupied module slot in the chassis should have a blank faceplate installed to ensure satisfactory protection from EMI and to guarantee adequate airflow through the chassis.

4 Hold the module by its front panel with one hand, and place your other hand under the edge of the metal panel to support the weight of the module.

Check the connectors for dust and packing materials.

CAUTION

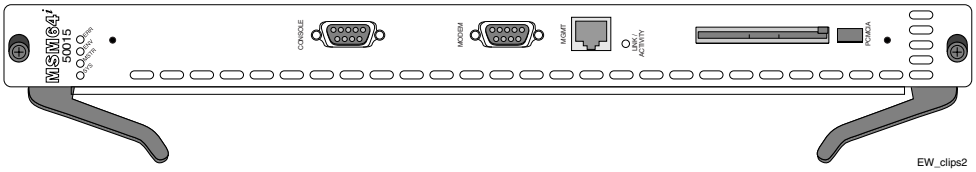
To prevent ESD damage, handle the module by the metal panel edges only. Never touch the components on the PCB or pins on any of the connectors.

5 Position the module correctly for the switch into which you are installing it.

For the BlackDiamond 6816 or the BlackDiamond 6804:

- The MSM is horizontal as shown in Figure 150.
- The module name is to the left.

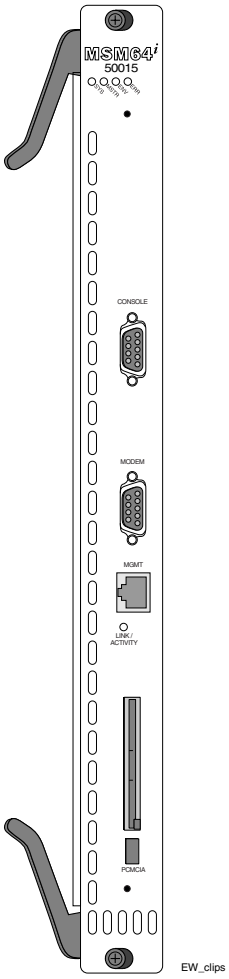
Figure 150: MSM before insertion in a BlackDiamond 6816 or a BlackDiamond 6804



For the BlackDiamond 6808:

- The MSM is vertical as shown in Figure 151.
- The module name is at the top.

Figure 151: MSM before insertion in a BlackDiamond 6808



6 Extend the ejector/injector levers.

7 Install the module as follows:

a Slide the MSM into the appropriate lettered slot of the chassis, until it makes contact with the backplane.

NOTE

Use the metal panel, not the PCB, to guide the MSM.

As the MSM begins to seat in the chassis, the ejector/injector levers begin to close.

b To close the ejector/injector levers, use both hands to push the levers toward the center of the module. Apply equal pressure to each lever.

c To secure the module, tighten the two screws with a #1 Phillips screwdriver.

NOTE

Tighten the screws of this module before *you insert additional modules. Otherwise, you might unseat modules that you have not secured.*

8 If you install a slave MSM, use the `synchronize` command to replicate all saved images and configurations from the master MSM to the slave MSM.

You are not prompted to synchronize the images and the configurations from the master to the slave. If not synchronized, the slave uses its image and the master configuration. This image/configuration mismatch will likely cause the switch to operate differently after failover.

CAUTION

Depending on the size and complexity of your network, you should install and configure a slave MSM module when there will be minimal network disruption. You may need to reboot your switch after you use the `synchronize` *command.*

To install additional MSMs, repeat steps 2 through 8.

Store the module packaging for future use.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Verifying the MSM Installation

After you install the MSM, verify that it is working correctly by checking the LEDs on the front panel of the module. If the MSM is operating normally, the front-panel LED indicators appear as follows:

- SYS LED—green blinking
- MSTR LED:
  - Green: Operating as master
  - Amber: Operating as slave
- ENV—green
- ERR—off
- Link/Activity:
  - Green: Link is up
  - Amber: Packet activity is occurring

For more information about MSM LED activity, see “MSM LEDs” on page 257.

Replacing MSMs

The BlackDiamond MSM is hot-swappable. You do not need to power off the system to remove a module.

You need the following tools and equipment to replace an MSM:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver
- Replacement MSM

To remove an MSM:

1. Attach an ESD strap to your wrist and connect the metal end to the ground receptacle on the top left corner of the switch front panel.
2. To loosen the module, unscrew the screws with a #1 Phillips screwdriver.
3. Simultaneously rotate the ejector/injector levers outward to disengage the module from the backplane.
4. Hold the module front panel with one hand, and place your other hand under the metal panel to support the weight of the module.

CAUTION

To prevent ESD damage, handle the module by the metal panel edges only. Never touch the components on the PCB or pins on any of the connectors.

5. Slide the module out of the chassis and place it immediately into an antistatic sack to protect it from ESD damage and to prevent dust from collecting on the module's connectors.
6. If you are installing a replacement MSM, follow the installation procedure described on page 257.

   If you are not installing a replacement MSM, attach a cover plate over the empty MSM slot.

To remove additional MSMs, repeat steps 2 through 5.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

16 BlackDiamond 6800 Series I/O Modules

This chapter includes the following topics:

- Configuring I/O Modules on page 263
- I/O module descriptions, starting on page 264
- Installing I/O Modules on page 294
- Replacing I/O Modules on page 296
- Installing XENPAK Modules on page 297

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove any BlackDiamond I/O modules.

BlackDiamond I/O modules consist of a printed circuit board mounted on a metal panel that acts as the insertion vehicle in a BlackDiamond 6800 series switch. The module carrier also includes ejector/injector levers and captive retaining screws at each end of the module front panel.

For more information about BlackDiamond I/O module specifications, see Appendix C, "Module Technical Specifications."

Configuring I/O Modules

No configuration information is stored on the I/O modules; all configuration information is stored on the MSM module(s).

When the BlackDiamond 6800 series switch is powered on, ExtremeWare generates a default configuration for any slots that contain I/O modules. The default configuration allows the I/O module ports to participate in the VLAN named *default*. The default configuration for the I/O module is not preserved unless you explicitly save the configuration to nonvolatile RAM (NVRAM).

You can configure parameters of the I/O module after it is installed or you can pre-configure a slot for a certain type of module and configuration. The pre-configured information is applied to the module after it is inserted. If you pre-configure a slot for a specific module type, and then insert a different type of module, the module reverts to its default configuration.

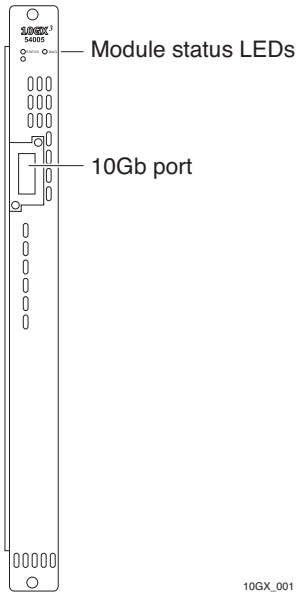
NOTE

See the ExtremeWare Software User Guide *and the* ExtremeWare Command Reference Guide *for more information about configuring I/O modules.*

10GX³ Module

Figure 152 shows the 10GX³ module.

Figure 152: 10GX³ module



The 10GX³ is a BlackDiamond I/O module with a single 10 Gigabit Ethernet port available using one XENPAK connector.

The 10GX³ has the following system and hardware features:

- One 10GbE XENPAK port per module; complies with XENPAK MSA
- Single I/O slot module for BlackDiamond 6804, BlackDiamond 6808, and BlackDiamond 6816
  - No chassis upgrade required
  - Supported by current management modules
  - Compatible with all BlackDiamond I/O modules
- Hot-swappable
- 802.3x Flow Control Generation (on transmit to throttle receive traffic)
- Up to 16 gigabit full-duplex bandwidth

LEDs

The 10GX3 module has the following LEDs:

- Module status (Status)
- Port status (Link Activity)
- Diagnostics

For information about the LEDs and their activity on the 10GX3 module, see “I/O Module LEDs” on page 293.

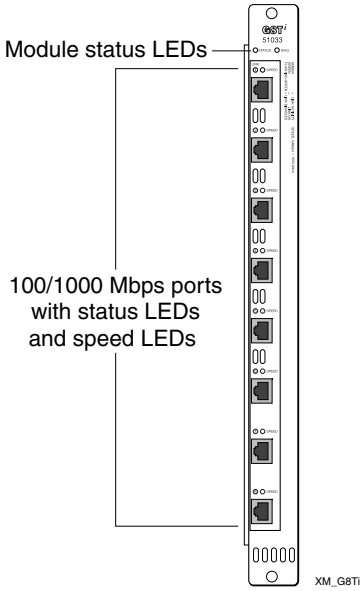
Software Requirements

The BlackDiamond MSM requires both BootROM 8.1 (or later) and the final release build of ExtremeWare 7.2 (or later) in order to recognize the 10GX3 I/O module.

G8Ti Module

Figure 153 shows the G8Ti module.

Figure 153: G8Ti module



The G8Ti module has eight autosensing 100/1000BASE-T ports that use standard RJ-45 connectors. The default configuration of the G8Ti module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in auto-negotiation mode.

LEDs

The G8Ti module has the following LEDs:

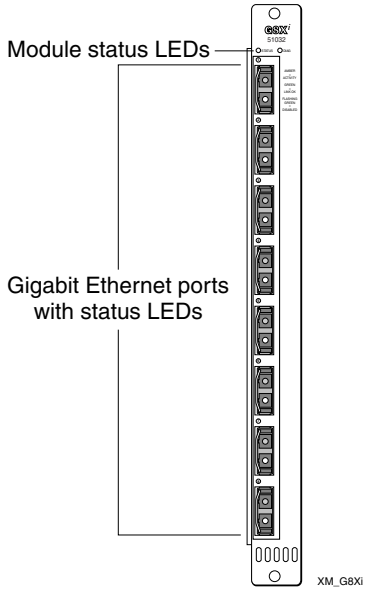
- Module status
- Port status
- Port speed

For information about the LEDs and their activity on the G8Ti module, see “I/O Module LEDs” on page 293.

G8Xi Module

Figure 154 shows the G8Xi module.

Figure 154: G8Xi module



The G8Xi module has eight unpopulated GBIC-based Gigabit Ethernet ports. All Gigabit Ethernet ports on these modules use standard GBIC connectors and support 1000BASE-SX, 1000BASE-LX, 1000BASE-LX70, and 1000BASE-ZX.

The default configuration of the G8Xi module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in auto-negotiation mode.

GBIC Ports

The G8Xi module supports any of the following GBICs:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LX70
- ZX GBIC
- LX100 GBIC
- UTP GBIC

Table 53 describes the media types and associated maximum distances for each GBIC type.

Table 53: GBIC types and maximum distances

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
SX (850 nm optical window)	50/125 µm multimode fiber	400	500
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	160	220
	62.5/125 µm multimode fiber	200	275
LX (1310 nm optical window)	50/125 µm multimode fiber	400	550
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	500	550
	10/125 µm single-mode fiber	–	5,000
	10/125 µm single-mode fiber*	–	10,000
ZX (1550 nm optical window)	10/125 µm single-mode fiber	–	50,000
ZX Rev 03 (1550 nm optical window)	10/125 µm single-mode fiber		70,000
LX70 (1550 nm optical window)	10/125 µm single-mode fiber	–	70,000
LX100 (1550 nm optical window)	10/125 µm single-mode fiber		100,000
UTP	Category 5 UTP cable	–	80

*Extreme Networks proprietary. Connections between two Extreme Networks 1000BASE-LX interfaces can use a maximum distance of 10,000 meters.

NOTE

For more information about the supported GBIC types, see “GBIC Specifications” on page 340.

LEDs

The G8Xi module has the following LEDs:

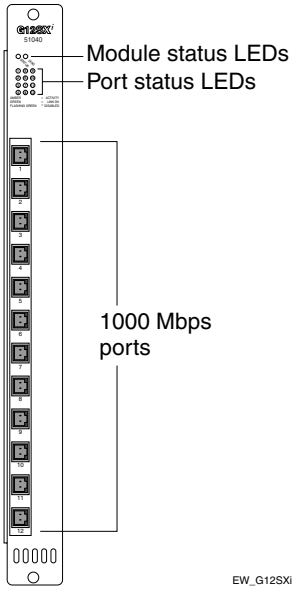
- Module status
- Port status

For information about the LEDs and their activity on the G8Xi module, see “I/O Module LEDs” on page 293.

G12SXi Module

Figure 155 shows the G12SXi module.

Figure 155: G12SXi module



The G12SXi module has 12 Gigabit Ethernet ports that use standard MT-RJ connectors, and supports 1000BASE-SX only. The default configuration of the G12SXi module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in auto-negotiation mode.

LEDs

The G12SXi module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the G12SXi module, see “I/O Module LEDs” on page 293.

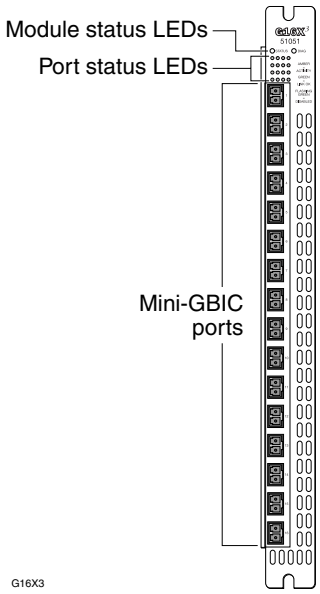
Software Requirements

The G12SXi module requires ExtremeWare version 6.1.4 or later.

G16X3 Module

Figure 156 shows the G16X3 module.

Figure 156: G16X3 module



The G16X3 module has 16 1000BASE-X ports using mini-GBIC (or small form factor pluggable (SFP)) slots.

The G16X3 ports are oversubscribed to the module's switch fabric. The module has eight groups of two ports each. Each group multiplexes traffic into a single full duplex gigabit link to the switch fabric.

To take advantage of this architecture, use a single port in each group before using all of the ports in any particular group. Table 54 lists the groups for the G16X3 module.

Table 54: G16X3 port groups

Ports	Group
1, 2	1
3 4	2
5, 6	3
7, 8	4
9, 10	5
11, 12	6
13, 14	7
15, 16	8

Populate ports 1, 3, 5, 7, 9, 11, 13, and 15 first; then populate ports 2, 4, 6, 8, 10, 12, 14, and 16.

NOTE

If congestion is detected on a port with flow control enabled, a flow control PAUSE frame is sent out that port. The PAUSE frame is not sent out on the other port in the group.

Table 55 describes the media types and the associated maximum distances for the GM-16X3 module.

Table 55: G16X3 media types and distances

Mini-GBIC Type	Media Type	Maximum Distance (meters)
1000BASE-SX	Multimode fiber	550
1000BASE-LX	Single-mode fiber	10,000
1000BASE-ZX	Single-mode fiber	70,000
1000BASE-BU	Single-mode fiber	10,000

Mini-GBIC Ports

The G16X3 module supports any of the following mini-GBICS:

- SX mini-GBIC
- LX mini-GBIC
- ZX mini-GBIC
- 1000BASE-BU mini-GBIC

NOTE

For more information about the supported mini-GBIC types, see "Mini-GBIC Types" on page 23.

LEDs

The G16X3 module has the following LEDs:

- Module status
- Port status
- Diagnostics

For information about the LEDs and their activity on the G16X3 module, see "I/O Module LEDs" on page 293.

Software Requirements

The G16X3 module requires ExtremeWare version 7.0.1b11 or later and BootROM 7.8 or later.

Hardware Requirements

Extreme Networks recommends using iPower power supplies (part numbers 50020, 50021, 50022) with F96Ti modules in a BlackDiamond 6800 chassis. A BlackDiamond 6800 chassis with the original power supplies (part number 50012) will power fewer G16X3 modules than a chassis with iPower power supplies.

Table 56 lists the number of G16X^3 modules that you can install in a BlackDiamond chassis depending on which power supplies are installed.

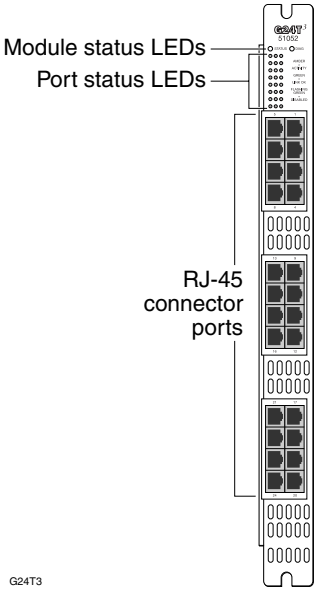
Table 56: G16X^3 modules supported

Chassis	Power Supply	G16X^3 Module
BlackDiamond 6804	any	4
BlackDiamond 6808	original power supplies	6
BlackDiamond 6808	iPower power supplies	8
BlackDiamond 6816	iPower power supplies	16

G24T3 Module

Figure 157 shows the G24T3 module.

Figure 157: G24T3 module



The G24T3 module has 24 1000BASE-T ports using RJ-45 connectors that autonegotiate for 10BASE-T, 100BASE-T, or 1000BASE-T.

The G24T3 ports are oversubscribed 4:1 to the module's switch fabric. The module has six groups of four ports each. Each group multiplexes traffic into a single full duplex gigabit link to the switch fabric.

To take advantage of this architecture, use the same number of ports in each group. Table 57 lists the groups for the G24T3 module.

Table 57: G24T3 port groups

Ports	Group
1, 2, 3, 4	1
5, 6, 7, 8	2
9, 10, 11, 12	3
13, 14, 15, 16	4
17, 18, 19, 20	5
21, 22, 23, 24	6

Populate ports 1, 5, 9, 13, 17, and 21 first; then, ports 2, 6, 10, 14, 18, and 22. then, ports 3, 7, 11, 15, 19, and 23; and finally, ports 4, 8, 12, 16, 20, and 24.

NOTE

If congestion is detected on a port with flow control enabled, a flow control PAUSE frame is sent out that port. The PAUSE frame is not sent out on the other port in the group.

The G24T^3 module supports distances of up to 100 meters over CAT 5 cabling.

LEDs

The G24T^3 module has the following LEDs:

- Module status
- Port status
- Diagnostics

For information about the LEDs and their activity on the G24T^3 module, see "I/O Module LEDs" on page 293.

Software Requirements

The G24T^3 module requires ExtremeWare version 7.0.1b5 or later and BootROM 7.8 or later on the switch.

Hardware Requirements

Extreme Networks recommends using iPower version power supplies (part numbers 50020, 50021, 50022) with F96Ti modules in a BlackDiamond 6800 chassis. A BlackDiamond 6800 chassis with the original power supplies (part number 50012) will power fewer G24T^3 modules than a chassis with iPower power supplies.

Table 58 lists the number of G24T^3 modules that you can install in a BlackDiamond chassis depending on which power supplies are installed.

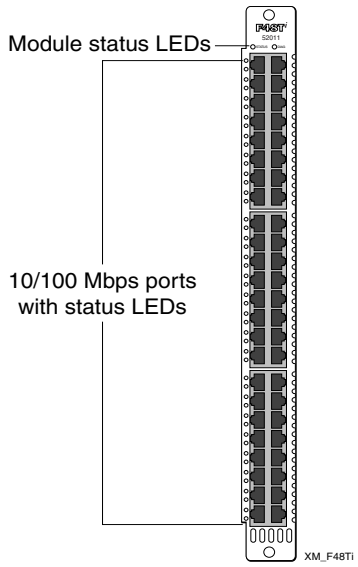
Table 58: G24T^3 modules supported

Chassis	Power Supply	G24T^3 Module
BlackDiamond 6804	any	4
BlackDiamond 6808	original power supplies	5
BlackDiamond 6808	iPower power supplies	7
BlackDiamond 6816	iPower power supplies	15

F48Ti Module

Figure 158 shows the F48Ti module.

Figure 158: F48Ti module



The F48Ti has 48 autosensing 10BASE-T/100BASE-TX ports. All ports use standard RJ-45 connectors.

The default configuration of the F48Ti module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in auto-negotiation mode.

LEDs

The F48Ti module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the F48Ti module, see “I/O Module LEDs” on page 293.

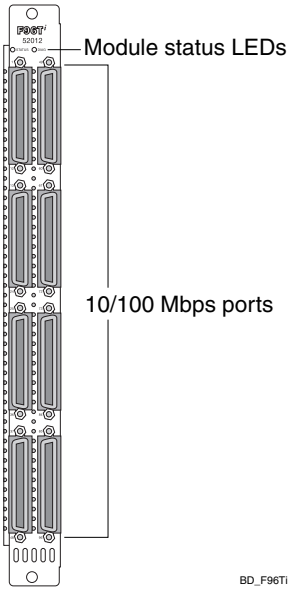
Software Requirements

The F48Ti module requires ExtremeWare version 6.1.4 or later.

F96Ti Module

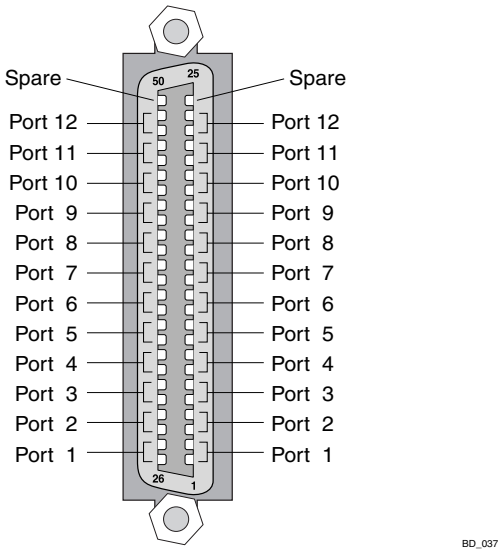
Figure 159 shows the F96Ti module.

Figure 159: F96Ti module



The F96Ti has 96 10BASE-T/100BASE-TX ports available through eight RJ-21 telco connectors. Each RJ-21 port provides twelve 10/100 Mbps ports. The RJ-21 port is shown in Figure 160.

Figure 160: RJ-21 port



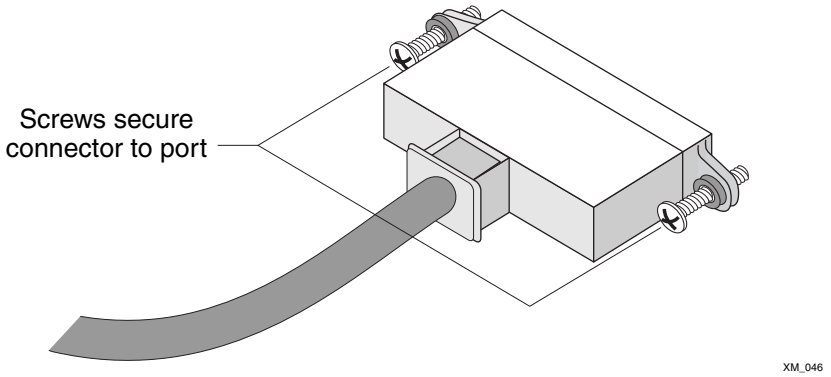
For connector pinouts and output signals, see Table 117 on page 354 in Appendix C, “Module Technical Specifications”.

To connect to the F96Ti module, use a 180-degree male RJ-21 connector with a shielded PVC trunk cable and secure to a maximum of 4 in-lbs of torque. You can access the ports in one of the following ways:

- Through a patch panel by terminating the cable and shield with an RJ-21 connector.
- Directly by using a cable that is terminated with 12 RJ-45 connectors.

The RJ-21 connector is shown in Figure 161. For cable specifications, see Table 126 on page 362. Appropriate cables are available from your local supplier.

Figure 161: RJ-21 connector



The default configuration of the F96Ti module is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in auto-negotiation mode.

LEDs

The F96Ti module has a module status LED.

For information about the module status LED and its activity on the F96Ti module, see "I/O Module LEDs" on page 293.

Software Requirements

The F96Ti module requires ExtremeWare version 6.1.8 or later and BootROM 6.5 or later.

Hardware Requirements

Extreme Networks recommends using iPower power supplies (part numbers 50020, 50021, 50022) with F96Ti modules in a BlackDiamond 6800 chassis. A BlackDiamond 6800 chassis with the original power supplies (part number 50012) will power fewer F96Ti modules than a chassis with iPower power supplies.

Table 59 lists the number of F96Ti modules that you can install in a BlackDiamond chassis depending on which power supplies are installed.

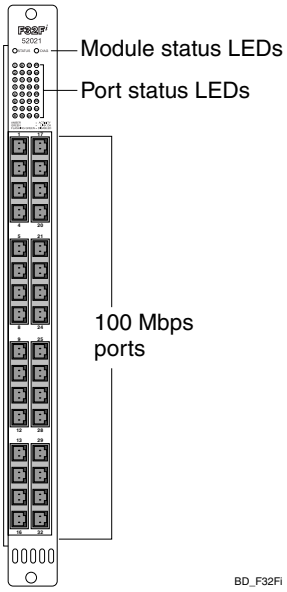
Table 59: F96Ti modules supported

Chassis	Power Supply	F96Ti Module	Additional Modules
BlackDiamond 6804	iPower power supplies	4	0
BlackDiamond 6808	original power supplies	6	0
BlackDiamond 6808	iPower power supplies	7	1 (ARM, G8Xi, G12SXi, P3cSi, P3cMi, or P12cMi)
BlackDiamond 6816	iPower power supplies	15	0

F32Fi Module

Figure 162 shows the F32Fi module.

Figure 162: F32Fi module



All F32Fi ports have 32 100BASE-FX ports and use standard MT-RJ connectors.

The default configuration of the F32Fi modules is as follows. All ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- Operate in 100 Mbps, full-duplex mode. Half-duplex mode is not supported.

LEDs

The F32Fi module has the following LEDs:

- Module status
- Port status

For information about the LEDs and their activity on the F32Fi module, see “I/O Module LEDs” on page 293.

Software Requirements

The F32Fi module requires ExtremeWare version 6.1.8 or later and BootROM 6.5 or later.

P3cSi, P3cMi, P12cSi, and P12cMi Modules

Extreme Networks offers the PoS module in the following configurations:

- P3cMi: four OC-3 multimode, short-reach optical interfaces
- P3cSi: four OC-3 single-mode, intermediate-reach optical interfaces
- P12cMi: two OC-12 multimode, short-reach optical interfaces
- P12cSi: two OC-12 single-mode, intermediate-reach optical interfaces

NOTE

The "c" in the names of the modules indicates that the optical interfaces on these modules operate in concatenated mode, which enables all the bandwidth to be devoted to a single payload stream.

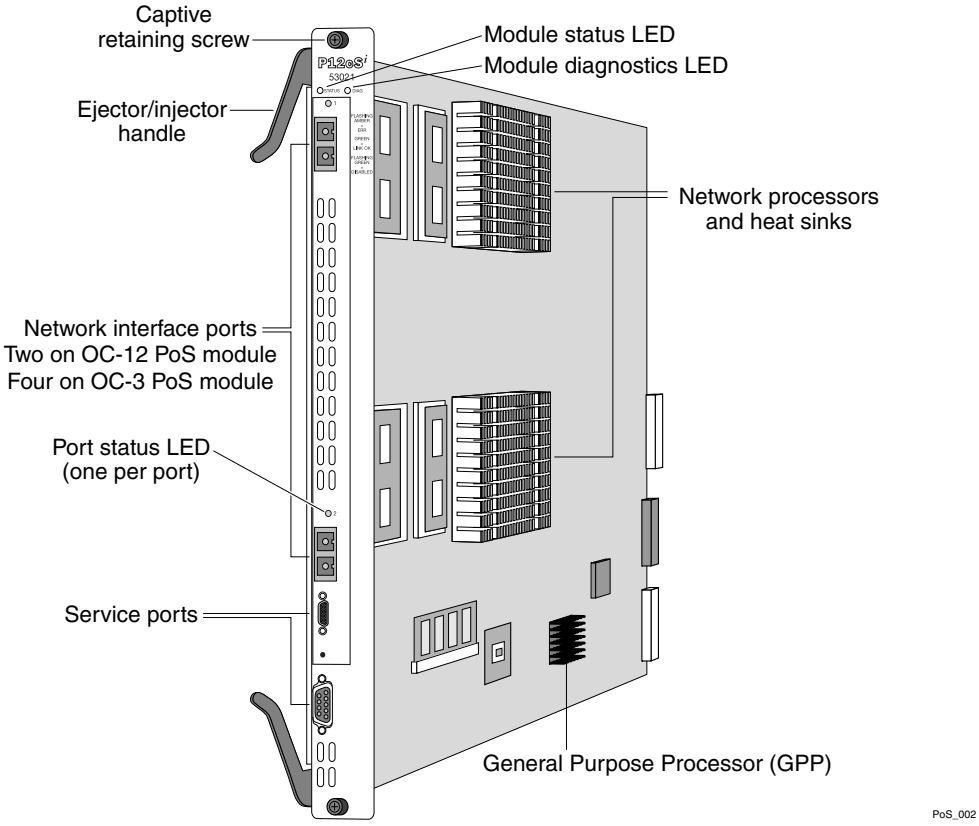
The PoS module has the following key components:

- Two high-performance network processors
- A General Purpose Processor (GPP) subsystem

The network processors are programmable devices that participate with the Extreme *"i"* chipset to support expanded functionality, features, and flexibility.

The GPP subsystem handles system control and I/O module management functions. The GPP subsystem resides outside of the I/O module data path to optimize performance.

Figure 163: Components and LEDs of the PoS module



NOTE

PoS modules are a Class 1 laser device.

Figure 164 shows the P3cSi and P3cMi modules.

Figure 164: P3cSi and P3cMi modules

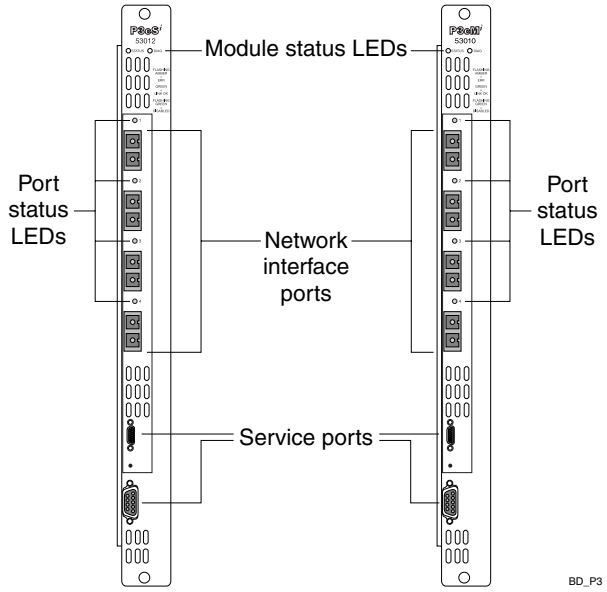
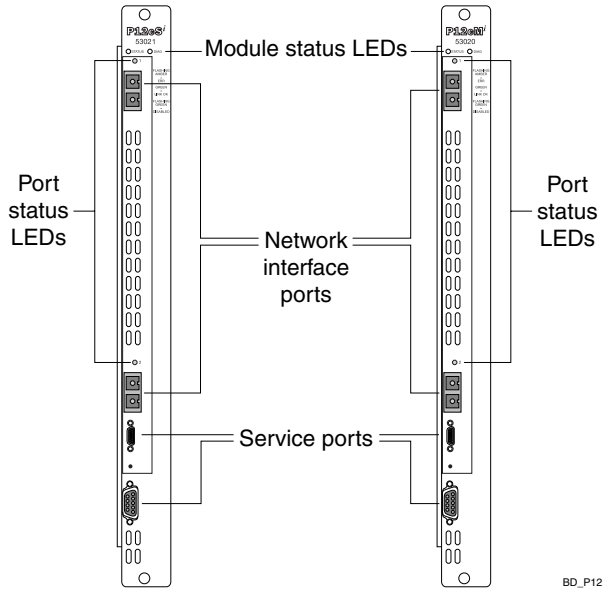


Figure 165 shows the P12cSi and P12cMi modules.

Figure 165: P12cSi and P12cMi modules



The P3cSi and P3cMi Packet over SONET (PoS), modules each have four OC-3 ports that use duplex SC connectors. The P12cSi and P12cMi PoS modules each have two OC-12 ports that use duplex SC connectors. The P3cSi and the P12cSi modules support single mode fiber-optic cable only, and the P3cMi and the P12cMi modules support multimode fiber-optic cable only. These modules connect the switch to a SONET infrastructure that is used by metropolitan area service providers and operators of server co-location networks.

In the first application, the metropolitan area network service provider can build service network sites in various cities, then use PoS modules in a BlackDiamond 6800 series switch to connect those cities to a carrier's SONET infrastructure.

In the second application, operators of server co-location networks can use PoS modules in BlackDiamond 6800 series switches to create a SONET-based connection between server co-location sites. The result is that their network is simpler to manage, and problems can be isolated and resolved more expediently.

The default configuration of the P3cSi, P3cMi, P12cSi, and P12cMi modules is as follows:

- Are added to the default VLAN as untagged. For P3c modules, only ports 1 and 3 are added to the default VLAN. Ports 2 and 4 are not added to any VLAN.
- Inherit the properties of the default VLAN (VLANid and so forth).

For optical specifications of the P3cSi, P3cMi, P12cSi, and P12cMi optical interfaces, see Table 129 on page 364.

PoS Module LEDs

The PoS modules are equipped with two module-level LEDs (STATUS and DIAG) and one port-level LED for each network interface port on the PoS module (see Figure 164 and Figure 165).

- STATUS LED—Near the top end of the PoS module front panel, near the ejector/injector handle. This LED indicator is a bi-color LED (displaying in either green or amber) that signals the operating status of the module as a whole.
- DIAG LED—Beside the STATUS LED. This LED is a single-color LED (displaying in amber only) that flashes amber when diagnostics are running on the module, and is solid amber if the module fails the diagnostics.
- Port-level LED—Next to the port number identifying each fiber optic network interface connector on the front panel of the module. The port LED is a bi-color LED (displaying in either green or amber) that signals the operating status of that network interface port.

NOTE

During the PoS module boot-up, the STATUS and DIAG LEDs may be incorrectly lit to solid green or solid amber. The LEDs reflect their true state after approximately 30 seconds when the module has completed its boot cycle.

For more information about PoS module LED activity, see "I/O Module LEDs" on page 293.

Service Ports

The PoS modules have two front-panel service ports (see Figure 164 and Figure 165): one is a subminiature DB-9 connector; the other is a micro HD-15 connector.

Both ports are reserved for use only by Extreme Networks technical support personnel for diagnostic procedures.

Software Requirements

The PoS modules require ExtremeWare 7.0 or later on both the MSM module and the PoS module, BootROM 7.8 for the MSM module, and BootROM 1.18 for the PoS module.

For more information about the software requirements, PoS module features, and PoS module configurations, see the *ExtremeWare Software User Guide* and the *ExtremeWare Command Reference Guide*.

Hardware Requirements

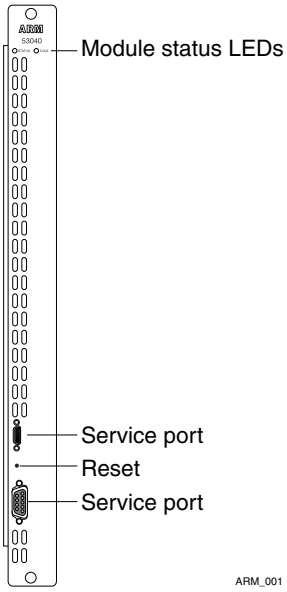
The PoS modules are compatible only with *"i"*series MSMs. For the most current list of I/O modules supported for use with the PoS modules, consult your release notes.

PoS modules installed in a BlackDiamond chassis require at least one BlackDiamond Ethernet I/O module also installed in the chassis in order to operate correctly.

ARM

Figure 166 shows the Accounting and Routing Module (ARM).

Figure 166: Accounting and Routing Module (ARM)



The ARM is a self-contained module for the BlackDiamond 6800 series chassis-based system. Unlike most other BlackDiamond modules, there are no external interfaces on the ARM. Instead, the ARM provides advanced IP services for the other I/O modules installed in the chassis. The ARM contains a powerful set of packet processing resources and four full-duplex Gigabit Ethernet internal ports that connect to the BlackDiamond backplane switch fabric. The ARM operates in a one-armed fashion:

- Receiving frames from the switch fabric.
- Processing the frames.
- Transmitting the frames back into the switch fabric which then sends them to the appropriate I/O module.

A maximum of four ARMs can be installed in a BlackDiamond 6800 series switch at any one time.

Physical Description

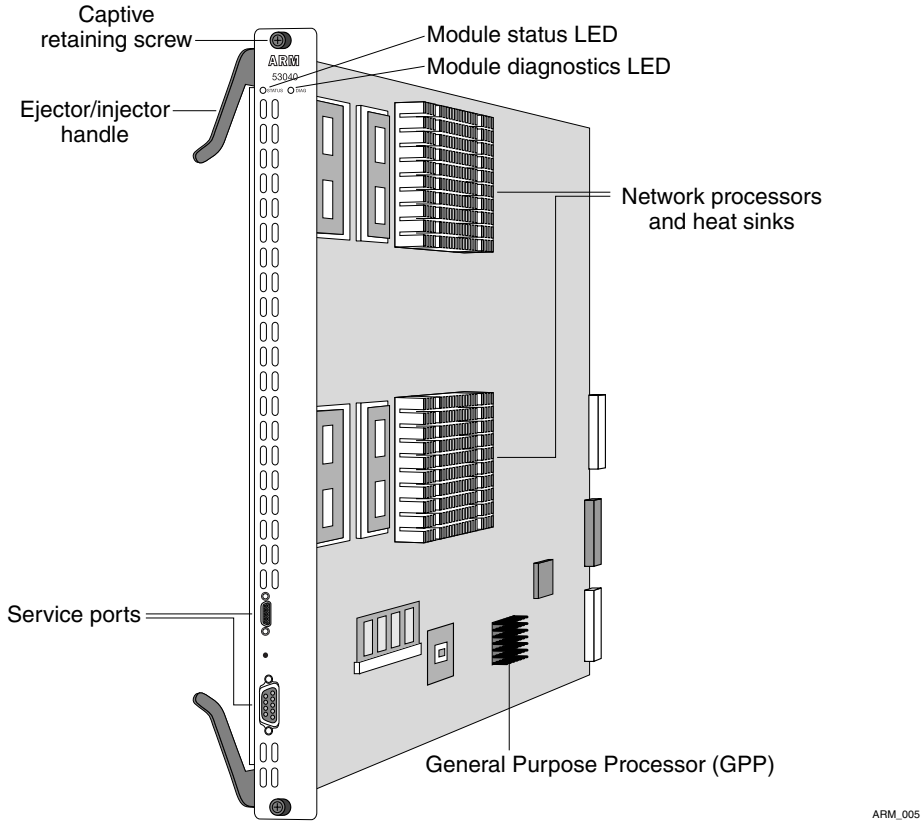
The ARM (Figure 167) has the following key components:

- Two high-performance network processors
- A GPP subsystem

The network processors are high-performance, programmable devices that enhance the Extreme "*i*" chipset to support expanded functionality, features, and flexibility.

The GPP subsystem handles system control and ARM management functions. The GPP subsystem resides outside the packet forwarding data path to optimize routing and billing performance.

Figure 167: Components and LEDs of the ARM



ARM LEDs

The ARM has two module-level LED indicators (STATUS and DIAG) (see Figure 167).

- STATUS LED—Located near the top end of the ARM front panel, near the ejector/injector handle. This LED indicator is a bi-color LED (displaying in either green or amber) that signals the operating status of the module.
- DIAG LED—Located beside the STATUS LED. The LED is a bi-color LED (displaying in either green or amber) that signals whether diagnostics are being run on the module.

NOTE

During the ARM boot-up, the STATUS and DIAG LEDs may be incorrectly lit to solid green or solid amber. The LEDs reflect their true state after approximately 30 seconds when the module has completed its boot cycle.

For more information about ARM LED activity, see "I/O Module LEDs" on page 293.

Service Ports

The ARM has two front-panel service ports: one port is a DB-9 connector; the other is a micro HD-15 connector (see Figure 167). Both ports are reserved for use only by Extreme Networks technical support personnel for diagnostic purposes.

Software Requirements

The ARM requires ExtremeWare 7.0 or later on both the MSM module and the ARM, BootROM 7.8 for the MSM, and BootROM 1.18 for the ARM.

For more information about the software requirements, ARM features, and ARM configurations, see the *ExtremeWare Software User Guide* and the *ExtremeWare Command Reference Guide*.

Hardware Requirements

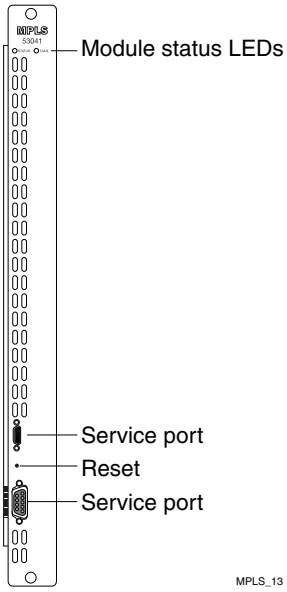
The ARM is compatible with *"i"* series MSMs only. For the most current list of I/O modules supported for use with the ARM module, consult your release notes.

ARMs installed in a BlackDiamond chassis require at least one BlackDiamond Ethernet I/O module also installed in the chassis in order to operate correctly.

MPLS Module

Figure 168 shows the MultiProtocol Label Switching (MPLS) module.

Figure 168: MultiProtocol Label Switching (MPLS) module



The MultiProtocol Label Switching (MPLS) module contains a powerful set of network processors that are specifically programmed to implement the MPLS function. The module has no external ports, but it contains four full-duplex Gigabit Ethernet internal ports that connect to the BlackDiamond backplane switch fabric. Each internal processor provides media-speed packet processing for two internal full-duplex Gigabit Ethernet ports. The MPLS module operates in a one-armed fashion:

- Receiving frames from the switch fabric.
- Processing the frames.
- Transmitting the frames back into the switch fabric which then sends them to the appropriate I/O module.

A maximum of four MPLS modules can be installed in a BlackDiamond 6800 series switch at any one time.

Physical Description

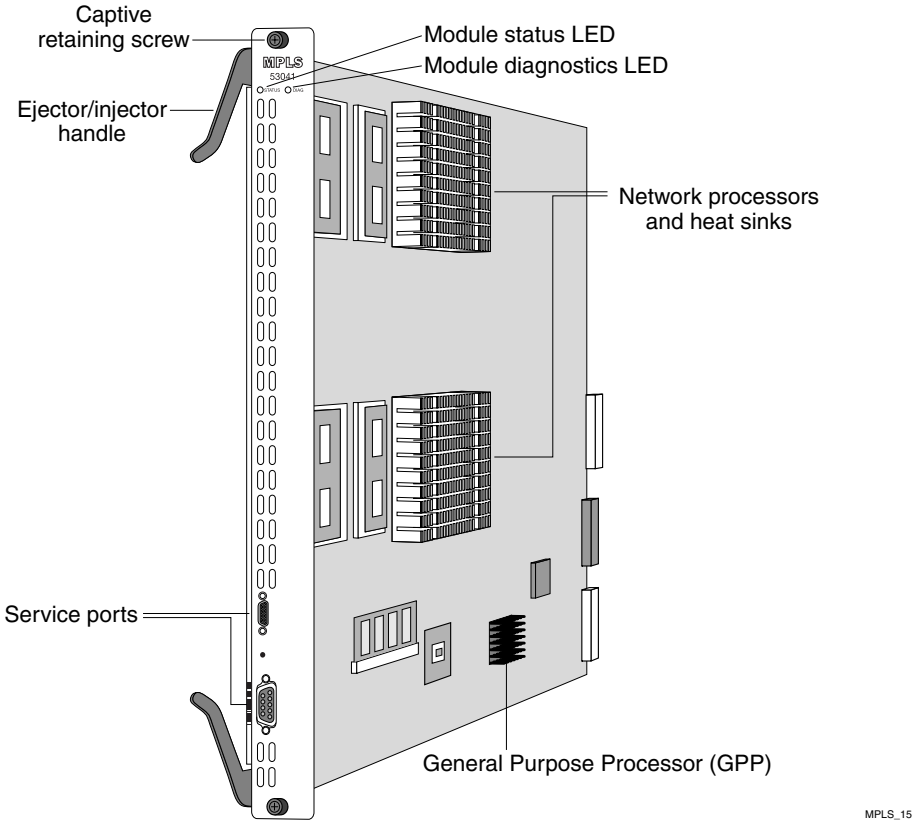
The MPLS module (see Figure 169) has the following key components:

- Two high-performance network processors
- A GPP subsystem

The network processors are high-performance, programmable devices that enhance the Extreme "*i*" chipset to support expanded functionality, features, and flexibility.

The GPP subsystem handles system control and MPLS management functions. The GPP subsystem resides outside the packet forwarding data path to optimize routing and billing performance.

Figure 169: Components and LEDs of the MPLS module



MPLS LED Indicators

The MPLS module has two module-level LED indicators (STATUS and DIAG) (see Figure 169).

- STATUS LED—Located near the top end of the front panel, near the ejector/injector handle. This LED indicator is a bi-color LED (displaying in either green or amber) that signals the operating status of the module.
- DIAG LED—Located beside the STATUS LED. The LED is a bi-color LED (displaying in either green or amber) that signals whether diagnostics are being run on the module.

NOTE

During the MPLS module boot-up, the Status and Diag LEDs may be incorrectly lit to solid green or solid amber. The LEDs reflect their true state after approximately 30 seconds when the module has completed its boot cycle.

For more information about MPLS module LED activity, see "I/O Module LEDs" on page 293.

Service Ports

The MPLS module is equipped with two front-panel service ports: one port is a subminiature DB-9 connector; the other is a micro HD-15 connector (see Figure 169). The ports are reserved for use only by Extreme Networks technical support personnel for diagnostic purposes.

Software Requirements

The MPLS module requires ExtremeWare 7.0 or later on both the MSM module and the MPLS module, BootROM 7.8 for the MSM module, and BootROM 1.18 for the MPLS module.

For more information about the software requirements, MPLS module features, and MPLS module configurations, see the *ExtremeWare Software User Guide* and the *ExtremeWare Command Reference Guide*.

Hardware Requirements

The MPLS module is compatible with "*i*" series MSMs only. For the most current list of I/O modules supported for use with the MPLS module, consult your release notes.

MPLS modules installed in a BlackDiamond chassis require at least one BlackDiamond Ethernet I/O module also installed in the chassis in order to operate correctly.

A3cSi and A3cMi Modules

Extreme Networks offers the ATM module in the following configurations:

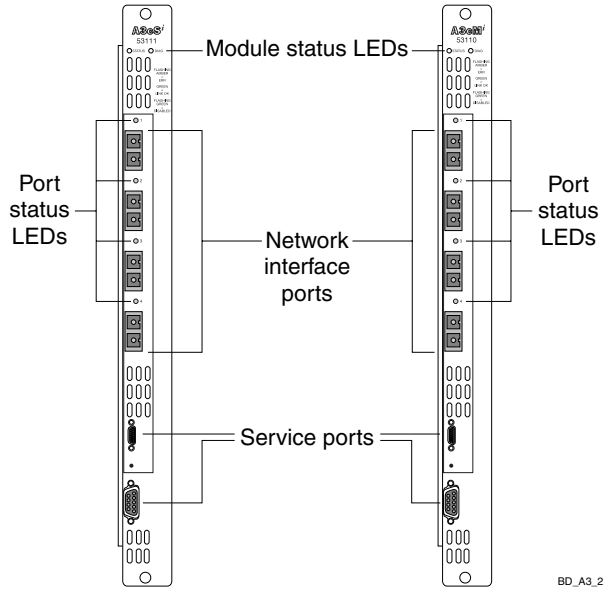
- A3cSi—four OC-3 single-mode, intermediate-reach optical interfaces
- A3cMi—four OC-3 multimode, short-reach optical interfaces

NOTE

The "c" in the names of the modules indicates that the optical interfaces on these modules operate in concatenated mode, which enables all the bandwidth to be devoted to a single payload stream.

Figure 170 shows the A3cSi and A3cMi modules.

Figure 170: A3cSi and A3cMi modules



The A3cSi and A3cMi (Asynchronous Transfer Mode (ATM)) modules have four OC-3 ports using duplex SC connectors. The A3cSi supports single mode fiber-optic cable only, and the A3cMi support multimode fiber-optic cable only. These modules interconnect metropolitan area networks across an ATM infrastructure, interconnect server co-location network sites directly using ATM links, and provide connectivity between a legacy Enterprise ATM network and an Ethernet backbone.

In the first application, the metropolitan area network service provider can build service network sites in various cities, then use ATM modules in a BlackDiamond 6800 series switch to connect those cities to a carrier's ATM infrastructure.

In the second application, operators of server co-location networks can use ATM modules in BlackDiamond 6800 series switches to create an ATM-based connection between server co-location sites. The result is that their network is simpler to manage, and problems can be isolated and resolved more expediently.

In the third application, a service provider can provide Ethernet-based services by using ATM modules in a BlackDiamond 6800 series switch to connect their Enterprise ATM network to an Ethernet backbone.

NOTE

The ATM module is a Class 1 laser device.

The default configuration of the A3cSi and A3cMi modules is as follows. Ports 1 and 3:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (VLANid and so forth).

For specifications of the A3cSi optical interface, see Table 133 on page 367.

Physical Description

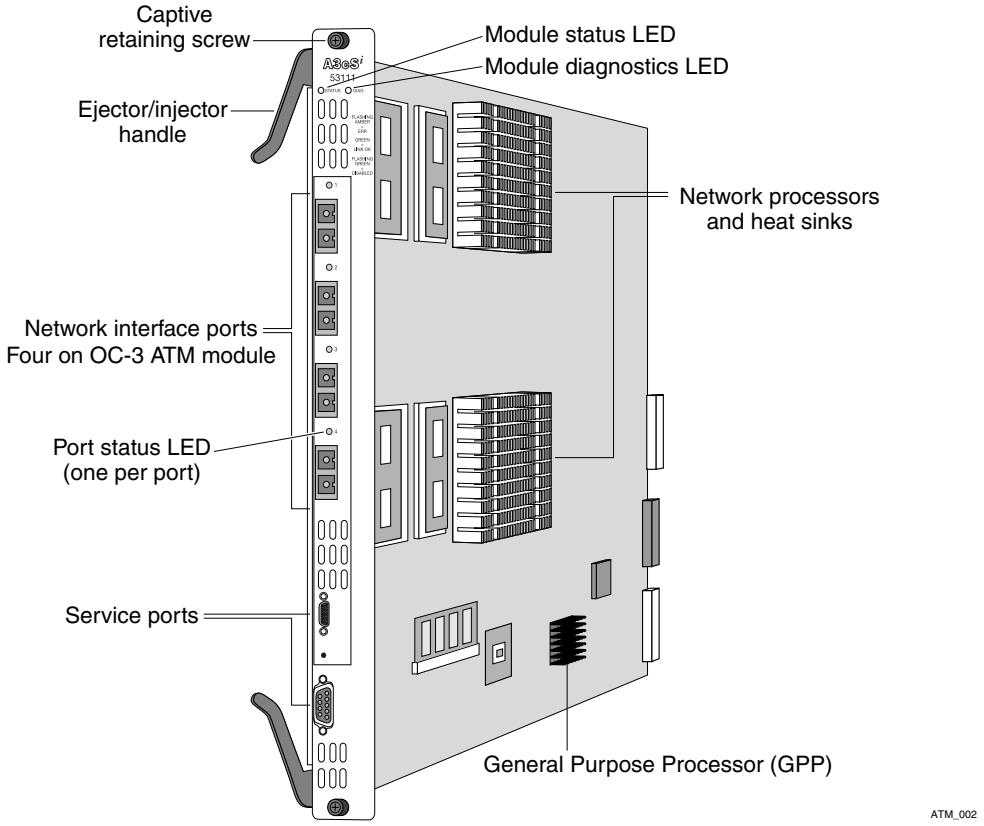
The ATM module (Figure 163) has the following key components:

- Two high-performance network processors
- A GPP subsystem

The network processors are programmable devices that participate with the Extreme "*i*" chipset to support expanded functionality, features, and flexibility.

The GPP subsystem handles system control and I/O module management functions. The GPP subsystem resides outside of the I/O module data path to optimize performance.

Figure 171: Components and LEDs of the ATM module



ATM Module LEDs

The ATM module is equipped with two module-level LED indicators (STATUS and DIAG) and one port-level LED indicator for each network interface port on the ATM module (see Figure 171).

- STATUS LED—Located near the top end of the ATM module front panel, near the ejector/injector lever. This LED indicator is a bi-color LED (lighting either green or amber) that signals the operating status of the module as a whole.
- DIAG LED—Located beside the STATUS LED. This LED is a single-color LED (lighting amber only) that flashes amber when diagnostics are running on the module, and is solid amber if the module fails the diagnostics.
- Port-level LED—Located next to the port number identifying each fiber optic network interface connector on the front panel of the module. The port LED is a bi-color LED (lighting in either green or amber) that signals the operating status of that network interface port.

NOTE

During the ATM module boot up, the STATUS and DIAG LEDs may be incorrectly lit to solid green or solid amber. The LEDs reflect their true state after approximately 30 seconds when the module has completed its boot cycle.

For more information on ATM module LED activity, see "I/O Module LEDs" on page 293.

Service Ports

The ATM module is equipped with two front-panel service ports: one port is a DB-9 connector; the other is a micro HD-15 connector (see Figure 171). Both ports are reserved for use only by Extreme Networks technical support personnel for diagnostic purposes.

Software Requirements

The ATM module requires ExtremeWare 7.0 or later on both the MSM module and the ATM module, BootROM 7.8 for the MSM module, and BootROM 1.18 for the ATM module.

For more information about the software requirements, ATM module features, and ATM module configurations, see the *ExtremeWare Software User Guide* and the *ExtremeWare Command Reference Guide*.

Hardware Requirements

The ATM module is compatible with *"i"* series MSMs only. For the most current list of I/O modules supported for use with the ATM module, consult your release notes.

ATM modules installed in a BlackDiamond chassis require at least one BlackDiamond Ethernet I/O module also installed in the chassis in order to operate correctly.

I/O Module LEDs

This section describes the LED activity on the BlackDiamond I/O modules:

- Table 60 describes the LED activity on the Ethernet I/O modules
- Table 61 describes the LED activity on the PoS and ATM modules
- Table 62 describes the LED activity on the ARM and MPLS modules

Table 60: BlackDiamond Ethernet I/O module LEDs

LED	Color	Indicates
Status	Green blinking	Normal operation
	Amber blinking	Configuration error, code version error, diagnostic failure, or other severe module error
	Off	No power
DIAG	Off	Normal operation
	Amber blinking	Diagnostics in progress
	Amber	Diagnostic failure
Port *x*	Green	Link up
	Green blinking	Port disabled
	Amber blinking	Packet activity
	Off	Link down

Table 61: BlackDiamond PoS and ATM module LEDs

LED	Color	Indicates
Status	Green blinking	Normal operation
	Amber blinking	Configuration error, code version error, diagnostic failure, or other severe module error
	Off	No power
DIAG	Off	Normal operation
	Amber blinking	Diagnostics in progress
	Amber	Diagnostic failure
Port *x*	Green	Link up[1]
	Green blinking	Port disabled
	Amber blinking, returning to green	Activity on link
	Amber blinking	Link down; SONET link problem
	Off	No received signal

1 If you have a PoS module, the link is up, but the PPP/VLAN interface might not be up. To determine whether PPP is up, use the `show ppp` command to display PPP status information.

Table 62: BlackDiamond ARM and MPLS module LEDs

LED	Color	Indicates
Status	Flashing green	Normal operation
	Flashing amber	Configuration error, code version error, diagnostic failure, or other severe module error
	Off	No power
DIAG	Green	Normal operation
	Flashing amber	Diagnostics in progress
	Amber	Diagnostic failure

Installing I/O Modules

You can insert I/O modules at any time, without causing disruption of network services. Complete the action of inserting a BlackDiamond I/O module in a reasonable time frame. Be sure to insert the module completely to avoid partial insertion or connection of backplane connectors.

You need the following tools and equipment to install an I/O module:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver
- Appropriate type of cable for the I/O module you plan to install

To install an I/O module:

1 Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top left corner of the switch front panel.

2 Select a slot for the module:

- Slots numbered 1 through 16 in the BlackDiamond 6816 chassis
- Slots numbered 1 through 8 in the BlackDiamond 6808 chassis
- Slots numbered 1 through 4 in the BlackDiamond 6804 chassis

CAUTION

You can install I/O modules only in the numbered slots. I/O modules do not fit in slots A, B, C, or D. Forceful insertion can damage the I/O module.

3 Remove the blank faceplate from the slot to make room for the module, if applicable.

NOTE

Any unoccupied module slot in the chassis should have a blank faceplate installed to ensure satisfactory protection from EMI and to guarantee adequate airflow through the chassis.

4 Hold the module by its front panel with one hand, and place your other hand under the edge of the metal panel to support the weight of the module. Check the connectors for dust and packing materials.

CAUTION

To prevent ESD damage, handle the module by the metal panel edges only. Never touch the components on the PCB or pins on any of the connectors.

5 Position the module correctly for the switch into which you are installing it.

For the BlackDiamond 6816 or the BlackDiamond 6804:

- The module is horizontal.
- The module name is to the left.

For the BlackDiamond 6808:

- The module is vertical.
- The module name is at the top.

6 Slide the module into the selected numbered slot of the chassis, until it makes contact with the backplane.

NOTE

Use the metal panel, not the PCB, to guide the I/O module

As the module begins to seat in the chassis, the ejector/injector levers begin to close.

7 To close the ejector/injector levers, use both hands simultaneously to push the levers toward the center of the module.

8 To secure the module, tighten the two captive screws using a #1 Phillips screwdriver.

NOTE

Tighten the screws of this module before *inserting additional modules. Otherwise, you might unseat modules that you have not secured.*

Store the module packaging for future use.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

To install additional I/O modules, repeat steps 2 through 8.

Verifying the I/O Module Installation

After you install an I/O module, verify that it is working correctly. Check the LEDs on the front panel of the I/O module and use the command-line interface (CLI) `show slot <slot number>` command to display slot-specific information about the newly installed module.

When the I/O module and its ports (if applicable) are configured and operating normally, the front-panel LED indicators should appear as follows:

- STATUS LED—green blinking
- DIAG LED—off
- Port status LED (per port):

The ARMs and MPLS modules do not have external network interfaces (ports); therefore, there are no port status LEDs on those modules.

— Green

— Amber blinking (all except ATM and PoS modules)

— Amber blinking, returning to green (ATM and PoS modules only)

For more information about I/O module LED activity, see "I/O Module LEDs" on page 293.

Displaying Slot Status Information

Assuming the I/O module has no problems, the command `show slot <slot>` (where <*slot*> is the number of the slot where you installed the module) displays information about the module including: general information about the module (name, serial number, part number), the state of the module (power down, operational, mismatch between the slot configuration and the module in the slot), and the status of the ports on the module.

If you have an ARM, PoS, ATM, or MPLS module, the command `show slot <slot>` also displays that ExtremeWare has detected the module and set it to the OPERATIONAL state. As the module progresses through its initialization, the GPP subsystem state changes to OPERATIONAL, and then each of the network processors state changes to OPERATIONAL.

For more information about slot status information, see the *ExtremeWare Software User Guide* and the *ExtremeWare Command Reference Guide*.

Replacing I/O Modules

All BlackDiamond I/O modules are hot-swappable. You do not need to power off the system to remove a module. Complete the action of removing a BlackDiamond I/O module in a reasonable time frame. Be sure to remove the module completely to avoid partial insertion or connection of backplane connectors.

NOTE

If you remove a BlackDiamond I/O module during traffic flow to the module, several error messages might be written to the log immediately following. These messages should cease to occur after 10 seconds. Under this circumstance, the error messages can be safely ignored. The error messages might contain one or more of the following:

```
04/13/1999 17:18.46 <DBUG:KERN> killPacket: HW pqmWaitRx failed
04/13/1999 17:18.46 <DBUG:KERN> pqmWaitKill failed. Card 1 is removed
```

You need the following tools and equipment to replace an I/O module:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver
- Replacement I/O module or blank faceplate if you are not replacing the I/O module

To remove an I/O module:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top-left corner of the switch front panel.
2. Use a #1 Phillips screwdriver to unscrew the two captive screws.

3 Simultaneously rotate the ejector/injector levers outward to disengage the module from the backplane.

4 Grasp the module front panel with one hand, and place your other hand under the metal panel to support the weight of the module.

CAUTION

To prevent ESD damage, handle the module by the metal panel edges only. Never touch the components on the PCB or pins on any of the connectors.

5 Slide the module out of the chassis and place it immediately into an antistatic sack to protect it from ESD damage and to prevent dust from collecting on the module's connectors.

6 If you are not going to install a replacement I/O module, cover the slot with a blank faceplate. Otherwise, follow the I/O module installation procedure on page 294.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

To remove additional I/O modules, repeat steps 2 through 5.

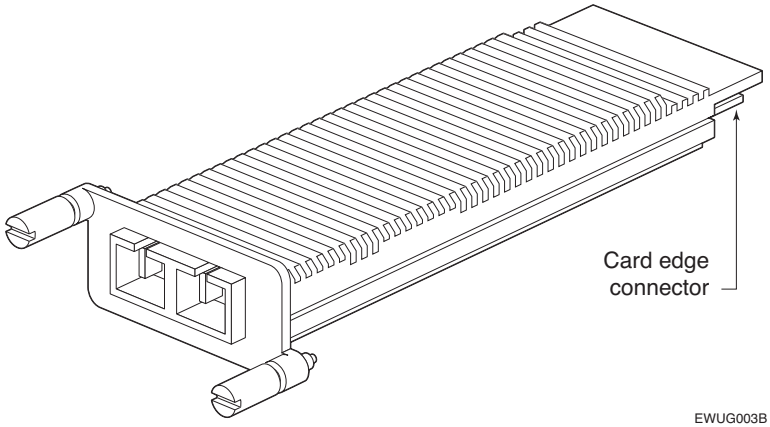
Installing XENPAK Modules

NOTE

For XENPAK module specifications, see Module Technical Specifications on page 339.

This section describes installing and removing the XENPAK module, a 10 Gbps optical transceiver. You can install or remove the XENPAK module from your Extreme Networks switch without powering off the system. The module is shown in Figure 172.

Figure 172: XENPAK module



The XENPAK module is a Class 1 Laser device that operates at 5 V. Use only Extreme-approved devices on all Extreme switches.

CAUTION

The XENPAK module can emit invisible laser radiation. Avoid direct eye exposure to the beam.

WARNING!

To prevent ESD damage to the XENPAK module, always use an ESD-preventive wrist strap when installing or removing the module. Handle the module by its sides only. Never touch the card-edge connectors at the insertion end of the module.

To install a XENPAK module:

1. Remove the XENPAK module from its antistatic container and remove the dust covers from the module connectors. If your module has a protective pad covering the card-edge connector, remove it.

   Store the antistatic container, dust covers, and card-edge connector protective pad in a clean location from which they can be easily retrieved if you need to uninstall the module.
2. Holding the module by its sides, insert it into the slot on the I/O module.
3. Slide the module as far into the slot as possible, until you hear it click, indicating that it is firmly attached.
4. Secure the module to the I/O module faceplate by turning the two captive screws clockwise until they are hand-tight.

NOTE

To ensure that your module is undamaged upon installation, you can correlate factory test data with your installation site test data by consulting the average power reference values shown on the XENPAK module test data sheet (Part No. 121074-00) enclosed with your module.

To remove a XENPAK module:

1. Turn the two captive screws counter-clockwise until they are completely free from the I/O module faceplate.

   WARNING!

   Disconnect the SC fiber-optic cable from the XENPAK module before removing the XENPAK module from the I/O module.
2. Holding both captive screws, carefully pull the XENPAK Module out of the slot.
3. Place the dust covers back into the XENPAK Module connectors.
4. Place the XENPAK Module immediately into an antistatic container to protect it from ESD damage and dust.

17 Replacing the BlackDiamond 6800 Series Switch Fan Tray

This chapter provides instructions to install the following BlackDiamond fan trays:

- BlackDiamond 6816 fan trays (no. 53013)
- BlackDiamond 6808 fan tray (no. 50013)
- BlackDiamond 6804 fan tray (no. 50053)

The chapter includes the following topics:

- Removing a BlackDiamond 6800 Series Fan Tray on page 299
- Installing a BlackDiamond 6800 Series Fan Tray on page 301

NOTE

Read the information in this chapter thoroughly before you attempt to install or remove any BlackDiamond fan tray.

Removing a BlackDiamond 6800 Series Fan Tray

BlackDiamond 6800 series fan trays are hot-swappable. You do not need to turn off power to a BlackDiamond 6800 series switch to remove a fan tray.

You need the following tools and equipment to remove a fan tray:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver

CAUTION

Only trained service personnel should perform service to BlackDiamond equipment. Before installing or removing any components, or carrying out any maintenance procedures, see Appendix A.

NOTE

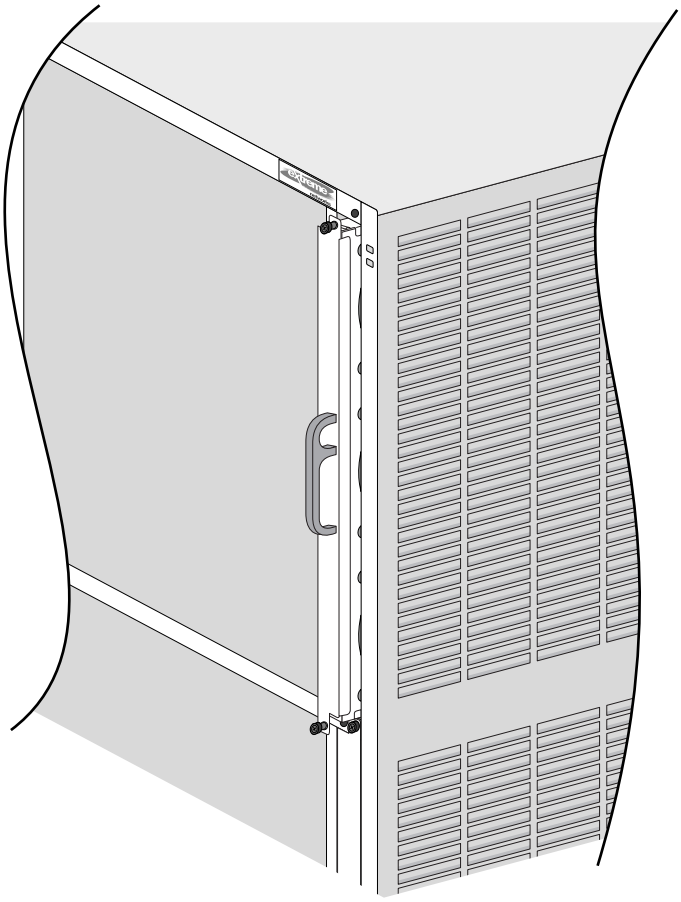
In the BlackDiamond 6816 or 6804, the fan trays are accessed from the front of the chassis. In the BlackDiamond 6808, the fan tray is accessed from the back of the chassis.

To remove a fan tray from the BlackDiamond 6800 series switch:

1. Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top left corner of the switch front panel.
2. Use a #1 Phillips screwdriver to unscrew the screws that secure the fan tray to the chassis.

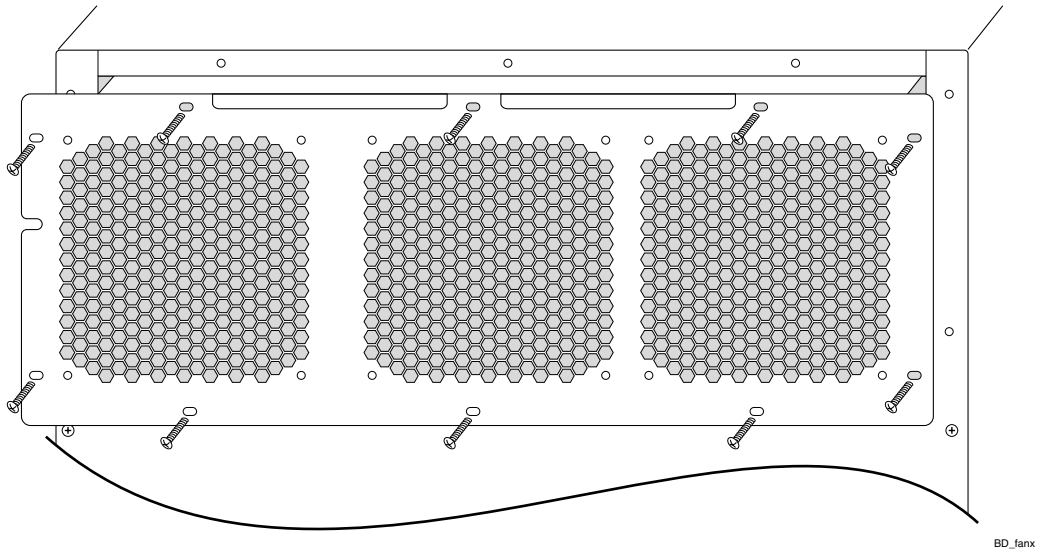
   Put the screws from the BlackDiamond 6808 fan tray aside in a safe place.
3. Using the handles on the front of the fan tray, pull it straight out of the chassis approximately ½ inch (12.7 mm), as shown in Figure 173 and Figure 174. This action disconnects the power to the fan tray.

Figure 173: Removing a BlackDiamond 6816 or BlackDiamond 6804 fan tray



BD_030

Figure 174: Removing the BlackDiamond 6808 fan tray



4 Allow the fan blades to stop spinning; then pull the fan tray the rest of the way out of the chassis.

WARNING!

Keep your hands your away from rotating fan blades.

5 Repeat this procedure for additional fan trays, if applicable.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.

Installing a BlackDiamond 6800 Series Fan Tray

BlackDiamond 6800 series fan trays are hot-swappable. You do not need to turn off power to a BlackDiamond 6800 series switch to install a fan tray.

You need the following tools and equipment to install a fan tray:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver

CAUTION

Only trained service personnel should perform service to BlackDiamond equipment. Before installing or removing any components, or carrying out any maintenance procedures, see Appendix A.

To install a fan tray in the BlackDiamond 6800 series switch:

1 Attach the ESD strap to your wrist and connect the metal end to the ground receptacle on the top left corner of the switch front panel.

2 Check the connectors for dust and packing materials.

3 Make sure the fan tray is right side up.

4 For the BlackDiamond 6816 switch and the BlackDiamond 6804 switch, support the fan tray with one hand under the fan tray and use the other hand to guide the fan tray into the slot. Carefully slide the new fan tray into the slot.

   For the BlackDiamond 6808 switch, use both hands to hold the fan tray handles and use the two pins on each side of the fan tray to guide the fan tray into the bay. Carefully slide the new fan tray into the bay.

   NOTE

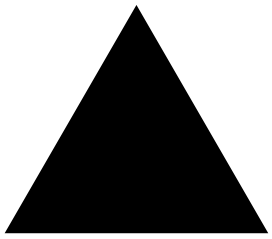
   If the chassis is powered on, the fan blades will begin turning as soon as the tray makes contact with the backplane.

5 Secure the fan tray.

   For the BlackDiamond 6816 switch and the BlackDiamond 6804 switch, align and tighten the captive retaining screws.

   For the BlackDiamond 6808 switch, insert and tighten the screws that you saved earlier.

Leave the ESD strap permanently connected to the chassis so that it is always available when you need to handle ESD-sensitive components.



Part 6
Switch Operation

18 Initial Switch and Management Access

This chapter describes:

- Connecting Equipment to the Console Port on page 305
- Logging In for the First Time on page 306

Connecting Equipment to the Console Port

Connection to the console port is used for direct local management. The console port settings are:

- Baud rate—9600
- Data bits—8
- Stop bit—1
- Parity—None
- Flow control—XON/XOFF

The terminal or PC with terminal-emulation software that you connect to any Summit, Alpine, or BlackDiamond switch must be configured with these settings. This procedure is described in the documentation supplied with the terminal.

Appropriate cables are available from your local supplier, or you can make your own. To ensure the electromagnetic compatibility of the unit, only shielded serial cables should be used. For specifications of the connectors on the cables used for a console connection, see “Console Port Cables” in Appendix B.

Logging In for the First Time

After your switch has completed all power-on self-tests, it is operational. When the switch is operational, you can log in and configure an IP address for the default VLAN (named *default*).

To manually configure the IP settings:

1 Connect a terminal or PC with terminal-emulation software to:

- The console port for Summit switches
- The SMMi for the Alpine 3808 and Alpine 3804 switches
- The console port for the Alpine 3802 switch
- The MSM for BlackDiamond switches

2 At your terminal, press [Return] one or more times until you see the login prompt.

3 At the login prompt, enter the default user name *admin* to log on with administrator privileges. For example:

```
login: admin
```

Administrator capabilities allow you to access all switch functions.

NOTE

For more information about logging in to the switch and configuring switch management access, see the ExtremeWare Software User Guide.

4 At the password prompt, press [Return].

The default user name, *admin*, has no password assigned to it. When you have successfully logged on to the system, the command-line prompt displays the system name (for example, `BlackDiamond6800>` in its prompt.

NOTE

For more information about how to make a specific system name, see the ExtremeWare Software User Guide.

5 Assign an IP address and subnetwork mask for VLAN *default* by typing:

config vlan default ipaddress 123.45.67.8 255.255.255.0

Your changes take effect immediately.

6 Save your configuration changes so that they will be in effect after the next system reboot, by typing:

save

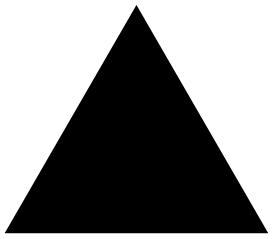
The configuration is saved to the configuration database of the SMMi modules in the Alpine switch and both MSMs in the BlackDiamond switch.

NOTE

For more information about saving configuration changes, see the ExtremeWare Software User Guide.

7 When you are finished with these tasks, log out of the switch by typing:

logout



Part 7
Appendixes

A Safety Information

Important Safety Information

WARNING!

Read the following safety information thoroughly before installing your Extreme Networks switch. Failure to follow this safety information can lead to personal injury or damage to the equipment.

Installation, maintenance, and removal of a switch, chassis, or its components must be done only by qualified service personnel.

Qualified service personnel have had appropriate technical training and experience that is necessary to be aware of the hazards to which they are exposed when performing a task and of measures to minimize the danger to themselves or other people.

Consider the following before unpacking your equipment:

- Install the equipment in a secured, enclosed, and restricted-access area, ensuring that only qualified service personnel have access to the equipment.
- Install the equipment only in a temperature- and humidity-controlled indoor area that is free of airborne materials that can conduct electricity. Too much humidity can cause a fire. Too little humidity can produce electrical shock and fire.
- When you handle the equipment, Extreme recommends the use of anti-static devices to reduce the risk of electronic damage to the equipment.

Power

The Summit series switch has either one or two power inputs depending on the switch model. The Alpine 3800 series switch has either one or two power inputs depending on the switch model. The BlackDiamond 6816 has either four 200-240 VAC power inputs, eight 110 VAC power inputs, or four -48 VDC power inputs. The BlackDiamond 6808 has either two 220 VAC power inputs, four 110 VAC power inputs, or two -48 VDC power inputs.

- The unit must be grounded. Do not connect the power supply unit to an AC outlet without a ground connection.
- The unit must be connected to a grounded outlet to comply with European safety standards.

- The socket outlet must be near the unit and easily accessible. You can only remove power from the unit by disconnecting the power cable from the outlet.
- This unit operates under Safety Extra Low Voltage (SELV) conditions according to the IEC 950 standard. The conditions are only maintained if the equipment to which it is connected also operates under SELV conditions.
- The appliance coupler (the connector to the unit and not the wall plug) must have a configuration for mating with an EN60320/IEC320 appliance inlet.
- *France and Peru only*
  This unit cannot be powered from IT† supplies. If your supplies are of IT type, this unit must be powered by 230 V (2P+T) via an isolation transformer ratio 1:1, with the secondary connection point labeled Neutral and connected directly to ground.

Power Cable

An AC power cord is not included with Extreme Networks devices. To purchase an AC power cord, contact your local Extreme Networks Channel Account Manager or Sales Manager, or purchase a cord from your local supplier.

Use an AC power cable appropriate for your country. Check your local electrical codes and regulatory agencies for power cable requirements. The countries listed below have the following additional requirements:

- USA and Canada
  - — The cable set must be UL-listed and CSA-certified.
  - — The cable set must have a rated current capacity of at least the amount rated for each specific product.
  - — For Alpine and Summit switches, the minimum specification for the flexible cable is No. 18 AWG (0.75 mm^2), Type SVT or SJT, 3-conductor.
  - — For Alpine and Summit switches, the AC attachment plug must be an Earth-grounding type with a NEMA 5-15P (10 A, 125 V) configuration.
- Denmark
  - — The supply plug must comply with section 107-2-D1, standard DK2-1a or DK2-5a.
- Switzerland
  - — The supply plug must comply with SEV/ASE 1011.
- Argentina
  - — The supply plug must comply with Argentinian standards.
- Japan
  - — In Japan, the power cord provided with the power supply or chassis is for use only with that Extreme product. It is not for use with any other Extreme product or other brands of equipment.

NOTE

When using dual power supplies, make sure that each AC power supply attaches to an independent power source.

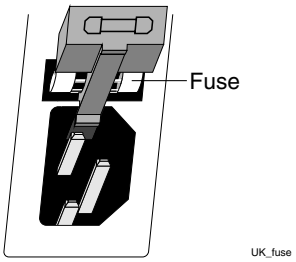
Fuse

This information pertains only to the Summit series of switches, except the Summit7i.

To change the fuse in a Summit series switch:

1. Disconnect power from the unit before opening the fuse holder cover.
2. Release the fuse holder by gently levering a small screwdriver under the fuse holder catch.
3. Replace the fuse. Use only fuses of the same manufacturer, rating, and type as the original.
4. Close the fuse holder.

Figure 175: Fuse



To comply with European safety standards, a spare fuse must not be fitted to the appliance inlet.

Connections

Fiber Optic ports—Optical Safety. To protect your eyes, never look at the transmit LED/laser through a magnifying device while it is powered on. Never look directly at a fiber port on the switch or at the ends of fiber cable when they are powered on.

This is a Class 1 laser device.

WARNING!

Use fiber optic ports only for data communications applications that require optical fiber. Use only with the appropriate connector. When not in use, replace dust cover. Using this module in ways other than those described in this manual can result in intense heat that can cause fire, property damage, or personal injury.

Lithium Battery

Lithium batteries included with Extreme products are encapsulated and must be replaced by qualified Extreme Service personnel only. Contact your Extreme Service personnel for product replacement. Do not attempt to replace a lithium battery. If these instructions are disregarded and replacement of these batteries is attempted, they should be replaced with the same or equivalent type, as recommended by the battery manufacturer.

WARNING!

Extreme Networks recommends that lithium batteries be replaced by qualified Extreme Service personnel only. If these instructions are disregarded, and a battery is incorrectly replaced, a dangerous explosion may occur. Replace only with the same or equivalent type recommended by the battery manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

Sicherheitshinweise (German)

Wichtige Sicherheitshinweise

WARNING!

WARNUNG! *Lesen Sie die folgenden Sicherheitshinweise aufmerksam, bevor sie Ihren Extreme Networks-Switch installieren. Eine Missachtung dieser Sicherheitshinweise kann zu Verletzungen führen oder das Gerät beschädigen.*

Die Installation, Wartung und die Deinstallation des Switch, des Chassis oder einer seiner Komponenten darf nur von qualifiziertem Servicepersonal durchgeführt werden.

Qualifiziertes Servicepersonal verfügt über eine entsprechende Ausbildung und die Erfahrung, die benötigt wird, um sich der Gefahren bei Ausführung einer Aufgabe bewusst zu sein und sich bzw. Dritte vor möglichen Risiken zu schützen.

Bitte beachten Sie die folgenden Hinweise bevor Sie Ihr Gerät auspacken:

- Installieren Sie das Gerät in einem sicheren, abgeschlossenen Arbeitsbereich mit beschränktem Zugang, so dass nur qualifiziertes Servicepersonal Zugang zu dem Gerät hat.
- Installieren Sie das Gerät nur in klimatisierten Innenbereichen. Stellen Sie sicher, dass sich in der Luft keinerlei elektrisch aufladbare Teilchen befinden. Zu hohe Feuchtigkeit kann zum Ausbruch eines Brandes führen. Zu geringe Feuchtigkeit kann zu einem elektrischen Schlag oder einem elektrischen Brand führen.
- Extreme empfiehlt für die Handhabung des Geräts die Benutzung von antistatischen Vorrichtungen, um das Risiko elektronischer Schäden am Gerät zu verringern.

B Switch Technical Specifications

This appendix describes the hardware technical specifications for "*e*" and "i" series of Extreme Network switches. The appendix is organized into the following sections:

- Common Switch Specifications on page 315
- Summit 200 Series Switch Specifications on page 318
- Summit 300 Series Switch Specifications on page 322
- Summit 400 Series Switch Specifications on page 326
- Summit "i" Series Switch Specifications on page 327
- Alpine 3800 Series Switch Specifications on page 330
- BlackDiamond 6800 Series Switch Specifications on page 333
- Power Connector Specifications on page 337

For information about the software technical specifications including protocols, MIBs, and standards, see the *ExtremeWare Software Users Guide*.

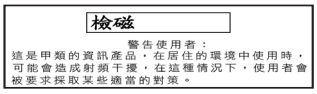
Common Switch Specifications

Table 63 lists specifications for environmental requirements, safety, electromagnetic interference, and certification marks that apply to all the Extreme Networks switches. "Console Port Cables" on page 316 provides information about the cables used to connect console ports on Extreme Networks switches.

Table 63: Common switch specifications

Environmental Requirements	
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-40° to 70° C (-40° to 158° F)
Operating Humidity	10% to 95% relative humidity, noncondensing
Standards	EN60068 to Extreme IEC68 schedule EN 300 019 (Summit 200 and Summit 400)

Table 63: Common switch specifications (Continued)

Definition of Certification Marks	
See switch specifications for applicability of these certification marks to that switch.	
	CE (European Community)
	VCCI (Japan's Voluntary Control Council for Interference by Information Technology Equipment)
	TUV/GS (German Notified Body)
	TUV/S (Argentina)
	GOST (Russian Federation)
ACN 090 029 066	C-Tick (Australian Communication Authority)
	Underwriters Laboratories (USA and Canada)
	MIC (South Korea)
	BSMI, Republic of Taiwan
	NOM (Mexican Official Normalization, Electronic Certification and Normalization)

Console Port Cables

Table 64 shows the pinouts for a DB-9 male console connector.

Table 64: Pinouts for the console connector

Function	Pin Number	Direction
DCD (data carrier detect)	1	In
RXD (receive data)	2	In
TXD (transmit data)	3	Out
DTR (data terminal ready)	4	Out

Table 64: Pinouts for the console connector (Continued)

Function	Pin Number	Direction
GND (ground)	5	-
DSR (data set ready)	6	In
RTS (request to send)	7	Out
CTS (clear to send	8	In

Figure 176 shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.

Figure 176: Null-modem cable pinouts

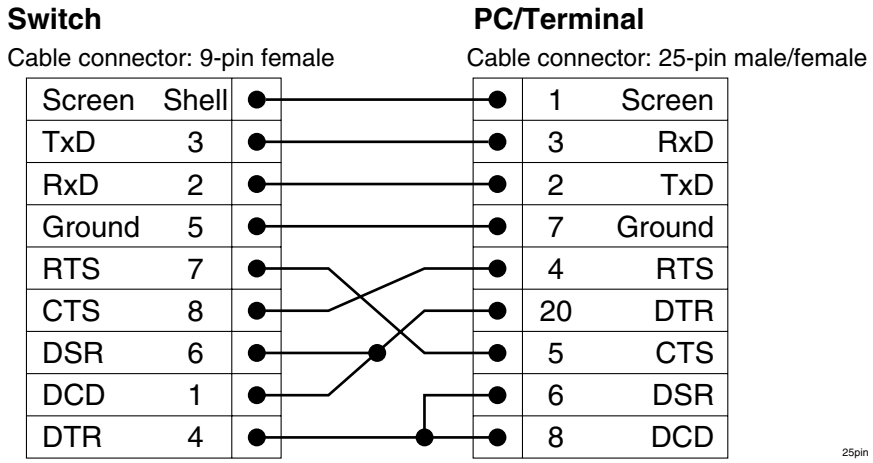
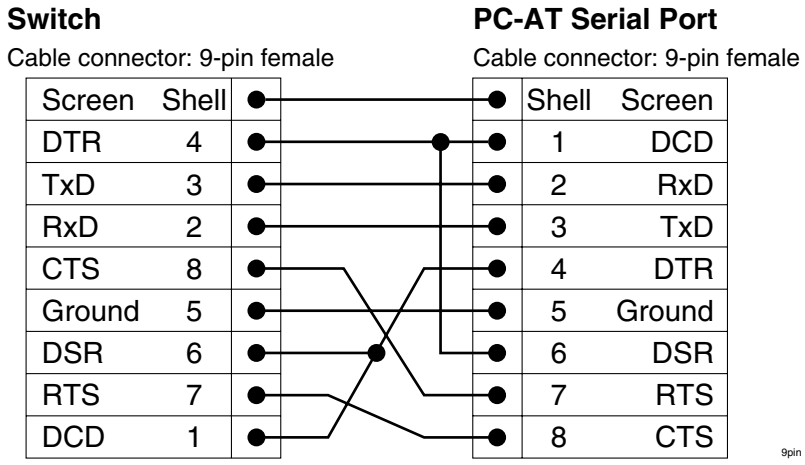


Figure 177 shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.

Figure 177: PC-AT serial null-modem cable pinouts



Summit 200 Series Switch Specifications

The Summit 200 series consists of 24-port and a 48-port models. Table 65 lists the specifications that are common within the Summit 200 series. Table 66 through Table 69 provide model-specific information.

Table 65: Summit 200 common specifications

Safety Standards	
North American Safety of ITE	
Certifications and Standards	• UL 60950-1:2003 1st Ed., Listed Device (US) • CSA 22.2#60950-1-03 1st Ed.(Canada) • Complies with FCC 21 CFR Chapter 1, Subchapter J (US Laser Safety) • CDRH Letter of Approval (US FDA Approval) • IEEE 802.3af 6-2003 Environment A for PoE Applications
European Safety of ITE	
Certifications and Standards	• EN60950-1:2001 • EN 60825-1+A2:2001 (Lasers Safety) • TUV-R GS Mark by German Notified Body • 73/23/EEC Low Voltage Directive
International Safety of ITE	
Certifications and Standards	• CB Report & Certificate per IEC 60950-1:2001+All Country Deviations • AS/NZX 3260 (Australia /New Zealand)
EMI/EMC Standard	
North America EMC for ITE Certifications and Standards	• FCC CFR 47 part 15 Class A (USA) • ICES-003 Class A (Canada)
European EMC Standards	
Certifications and Standards	• EN 55022:1998 Class A • EN 55024:1998 Class A (includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11) • EN 61000-3-2,3 (Harmonics & Flicker) • ETSI EN 300 386:2001 (EMC Telecommunications) • 89/336/EEC EMC Directive

Table 65: Summit 200 common specifications

Safety Standards	
International EMC Certifications	
Certifications and Standards	• CISPR 22:1997 Class A (International Emissions) • CISPR 24:1997 Class A (International Immunity) • IEC/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A • IEC/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A • IEC/EN 61000-4-4 Transient Burst, 1kV, Criteria A • IEC/EN 61000-4-5 Surge, 2kV, 4kV, Criteria A • IEC/EN 61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A • IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country Specific	
Certifications and Standards	• VCCI Class A (Japan Emissions) • AS/NZS 3548 ACA (Australia Emissions) • CNS 13438:1997 Class A (BSMI-Taiwan) • MIC Mark, EMC Approval (Korea)
Telecom Standards	
Certifications and Standards	• ETSI EN 300 386:2001 (EMC Telecommunications) • ETSI EN 300 019 (Environmental for Telecommunications)
Operational and Transportation Standards	
Certifications and Standards	• EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage • EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation • EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational • EN/ETSI 300 753 (1997-10) - Acoustic Noise • ASTM D3580 Random Vibration Unpackaged 1.5G

Table 65: Summit 200 common specifications

Safety Standards	
Operating Conditions	
Certifications and Standards	o Operating Temperature Range 0°C to 40°C (32 F to 104 F) o Operating Humidity:10% to 95% relative humidity, non-condensing o Operating Altitude 0-3000 meters (9,850ft) o Operational Shock (Half Sine in Rack): 30 m/s2 (3g), 11ms, 60 Shocks o Operational Sine Vibration (In Rack): 5-100-5 Hz @ 2/10G, 0-Peak, 1 Oct./min. o Operational Random Vibration: 3-500MHz @ 1.5g rms o Acoustic Sound: Declared Sound Power = < 6.3 belsA per EN 300 753 (10-1997) in accordance with ISO 7779 & ISO 9296.
Storage & Transportation Conditions (Packaged):	
Condition Standards	• Transportation Temperature:-40°C to 70°C (-40 F to 158 F) • Storage and Transportation Humidity:10% to 95% relative humidity, non-condensing • Packaged Shock (Half Sine): 11ms, 100 m/s2, 300 Shocks • Vibration, Sinusoidal 5-62 Hz, 5mm/s velocity,62-200 Hz, 0.2g • Random Vibration: 5-20 Hz @ 1.0 ASD w/-3dB/oct. from 20-200 Hz • 14 drops min on sides & corners @ 41"
Power Cord Requirements	
Usage Standards	• AC power cords are not provided with Extreme Networks switches. To purchase an AC power cord, contact your local Extreme Networks Channel Account Manager or Sales Manager, or purchase a cord from your local supplier. • PSU used outside the US require obtaining a power cord with certifications applicable to the country of interest. • Power Cord IEC Connector: IEC 320 C13 • Power Cord Min Wire Size: 18 AWG (.823 mm2) copper stranded • Power Cord Max Length: 3m(10ft) End • Power Cord Max Length: 3m(10ft)

Table 66: Summit 200-24 and Summit 200-48 specifications

Power Supply for Summit 200-24 and Summit 200-48	
AC Line Frequency:	50 Hz to 60 Hz
Input Voltage Options:	100 VAC to 240 VAC, auto-ranging
Nominal Operating Voltage	120 VAC
Current Rating:	100-120/200-240 VAC 2.0/1.0 A 0.5/0.25A

Table 67: Summit 200-24 unique specifications

Physical and Environmental	
Dimensions	Height: 1.75 inches (4.44 cm) Width: 17.3 inches (43.94 cm) Depth: 8.1 inches (20.57 cm)
Weight	5.72 lbs (2.6 kg)
Heat Dissipation, Watts/BTU	24.1 W
Acoustic Sound	
Sound Power in accordance with EN 300 753 (10-1997)	Sound Power: 53 dBA per ISO 7779 Declared Sound Power: 5.5 belsA per ISO 779 and ISO 9296
Sound Pressure in accordance with NEBS GR-63, Issue 2	Bystander Sound Pressure: 42 dBA rear @ 0.6m

Table 68: Summit 200-48 unique specifications

Physical and Environmental	
Dimensions	Height: 1.75 inches (4.44 cm) Width: 17.3 inches (43.94 cm) Depth: 12.2 inches (31.00 cm)
Weight	9.7 lbs (4.4 kg)
Heat Dissipation, Watts/BTU	48.0 W
Acoustic Sound	
Sound Power in accordance with EN 300 753 (10-1997)	Sound Power: 51.7 dBA per ISO 7779 Declared Sound Power: 5.2 belsA per ISO 779 and ISO 9296

Table 69: Summit 200-24fx and Summit 200-24fx-TAA unique specifications

Physical and Environmental	
Dimensions	Height: 1.75 inches (4.44 cm) Width: 17.3 inches (43.94 cm) Depth: 12.3 inches (31 cm)
Weight	9.5 lbs (4.3 kg)
Heat Dissipation, Watts/BTU	45 W
Package Dimensions	Height: 3.62 inches (9.2 cm) Width: 17.48 inches (44.4 cm) Depth: 23.07 inches (58.6 cm)
Package Weight	12.25 lbs (5.56 kg)
Power Supply Input	
Voltage Input Range	90 - 264 V AC
Nominal Voltage Range	100 - 240 V AC
Maximum Input Amperages	.6 A @ 200 V AC (high-line)
	1.5A @ 90 V AC (low-line)
AC Line Frequency Range	47 to 63 Hz
AC Power Supply Input Socket	IEC 320 C14
Minimum Wire Size	18 AWG (.82mm^2) copper stranded

Summit 300 Series Switch Specifications

The Summit 300 series has two models, a 24-port and a 48-port model. Table 70 lists the specifications that are common to both models. Table 71 and Table 72 give model-specific information.

Table 70: Summit 300 common specifications

Heat Dissipation	185 W maximum (631 BTU/hr maximum)
Power Supply	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	Summit 300-48: 90 VAC to 264 VAC, auto-ranging Summit 300-24: 100 VAC to 240 VAC, autoranging
Current Rating	100-240 VAC 3.0/6.0 A max.
Environmental Requirements	
Operational and Transportation Standards	• EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage • EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation • EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational • EN/ETSI 300 753 (1997-10) - Acoustic Noise • ASTM D5276 Drop Packaged • ASTM D3580 Random Vibration Unpackaged 1.5G

Table 71: Summit 300-24 unique specifications

Physical and Environmental	
Dimensions	Height: 1.75 inches (44.45mm) Width: 17.35 inches (440.69 mm) Depth: 15.3 inches (388.62 mm)
Weight	14 lbs. (6.35 kg)
Heat Dissipation, Watts/BTU	Without PoE loads: 70 W With full PoE loads: 140 W
Acoustic Sound	
Sound Power in accordance with EN 300 753 (10-1997)	Sound Power: 57 dBA per ISO 7779 Declared Sound Power: 6.0 belsA per ISO 779 and ISO 9296
Sound Pressure in accordance with NEBS GR-63, Issue 2	Bystander Sound Pressure: 46 dBA rear @ 0.6m

Table 72: Summit 300-48 unique specifications

Physical and Environmental	
Dimensions	Height: 3.5 inches (8.89 cm) Width: 17.25inches (43.82 cm) Depth: 18.25 inches (46.36 cm)
Weight	14 lbs. (6.35 kg) (with one power supply unit)
Temperature Power-off	149° F to 167° F (65° C to 75° C)
Acoustic Sound	
Sound Power in accordance with EN 300 753 (10-1997)	Sound Power: 52 dBA per ISO 7779 Declared Sound Power: 6.5 belsA per ISO 779 and ISO 9296
Sound Pressure in accordance with NEBS GR-63, Issue 2	Bystander Sound Pressure: 54 dBA rear @ 0.6m

Summit Switch Power Supply Specifications

Table 73 lists the electrical specifications for the Summit 300-48 internal power supply.

Table 73: Summit 300-48 internal power supply electrical specifications

Ratings	
Nominal Input Voltage	100/115/200/208/230 VAC
Input Voltage Range	85 VAC to 264 VAC
AC Line Frequency	47 Hz to 63 Hz
Power Supply Input Connection	IEC60320 C13 with minimum 18 AWG stranded copper wire
Maximum Input Current	9.5 A @ 90 VAC, 6.95 A @ 115 VAC, 3.39 A @ 230 VAC
Total Output Power	600 W total, 450 W available for PoE applications
Temperature Power-off	65° to 75° C (149° to 167° F)

Table 73: Summit 300-48 internal power supply electrical specifications (Continued)

Environmental Operating Conditions	
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-40° to 70° C (-40° to 158° F)
Operating Humidity	10% to 95% relative humidity, noncondensing
Operational Shock	30 m/s2 (3g)
Standards	EN/ETSI 300 019-2-1 v2.1.2 – Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 – Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 – Class 3.1e Operational EN/ETSI 300 753 (1997-10) – Acoustic Noise ASTM D5276 Drop Packaged ASTM D3580 Random Vibration Packaged 1.5G

Table 74 lists the environmental and safety specifications for the Summit 300-48 power supply.

Table 74: Summit 300-48 internal power supply environmental and safety specifications

Safety	
Agency Certifications and Standards	North American Safety of ITE • UL60950 3rd Edition, Listed Device • CSA 22.2#60950-00 • NOM/NYCE (Mexico Safety) European Safety of ITE • EN60950:2000+All Available Country Deviations • 73/23/EEC Low Voltage Directive International Safety of ITE • CB Scheme IEC 60950:1999+All Country Deviations • AS/NZX 3260 (Australia /New Zealand) • GOST (Russia)

Table 74: Summit 300-48 internal power supply environmental and safety specifications (Continued)

Electromagnetic Interference/ Compatibility (EMI/EMC)	
Certifications and Standards	North America EMC for ITE • FCC CFR 47 part 15 Class A • ICES-003 Class A European EMC standards for ITE • EN 55022:1998 Class A • EN 55024:1998 Class A (includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11) • EN 61000-3-2,3 (Harmonics & Flicker) • ETSI EN 300 386:2001 (EMC Telecommunications) • 89/336/EEC EMC Directive International EMC Certifications • CISPR 22:1997 Class A • CISPR 24:1997 Class A • VCCI Class A (Japan) • AS/NZS 3548 (Australia) • CNS 13438:1997 Class A (BSMI-Taiwan) • MIC Mark (Korea)
Environmental Operating Conditions	
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-40° to 70° C (-40° to 158° F)
Operating Humidity	10% to 95% relative humidity, noncondensing
Operational Shock	30 m/s2 (3g)
Standards	EN/ETSI 300 019-2-1 v2.1.2 – Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 – Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 – Class 3.1e Operational EN/ETSI 300 753 (1997-10) – Acoustic Noise ASTM D5276 Drop Packaged ASTM D3580 Random Vibration Packaged 1.5G

Table 75 lists the specifications for the EPS-160 external power supply for the Summit 400-48t and Summit 400-24t switches.

Table 75: EPS-160 AC Power Supply Specifications

AC Input Specifications	
Input Voltage	100 VAC to 240 VAC, 50 Hz to 60 Hz
Current Rating	4A at 100 VAC, 2A at 240 VAC
Maximum Inrush Current	30A at 100 VAC, 50A at 50 VAC
Output Specifications	
	+12V DC, maximum output current 13A
	+5V DC, maximum output current 1.5A

Summit 400 Series Switch Specifications

The Summit 400 series has three models, the Summit 400-24t, Summit 400-24p, and Summit 400-48t. Table 76 lists specifications for the Summit 400-24t. Table 77 lists specifications for the Summit 400-24p. Table 78 lists specifications for the Summit 400-48t switch.

Table 76: Summit 400-24t specifications

Physical and Environmental	
Dimensions	Height: 1.7 inches (4.3 cm) Width: 17.4 inches (44.2 cm) Depth: 15.3 inches (38.9 cm)
Weight	11.5 lb (5.22 kg)
Heat Dissipation, Watts/BTU	80 W
Acoustic Sound	
Sound Power in accordance with EN 300 753 (10-1997)	Sound Power: 66 dBA per ISO 7779 Declared Sound Power: 6.9 belsA per ISO 779 and ISO 9296
Sound Pressure in accordance with NEBS GR-63, Issue 2	Bystander Sound Pressure: 56 dBA rear @ 0.6m
Power Supply	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	100 VAC to 240 VAC, autoranging
Current Rating	100–120 VAC 1.5 A 200-249 VAC 1 A

Table 77: Summit 400-24p specifications

Physical and Environmental	
Dimensions	Height: 1.7 inches (4.3 cm) Width: 17.4 inches (44.2 cm) Depth: 15.3 inches (38.9 cm)
Weight	14.25 lb (6.46 kg)
Heat Dissipation, Watts/BTU	Without PoE loads: 80 W With full PoE loads: 140 W
Acoustic Sound	
Sound Power in accordance with EN 300 753 (10-1997)	Sound Power: 67 dBA per ISO 7779 Declared Sound Power: 6.9 belsA per ISO 779 and ISO 9296
Sound Pressure in accordance with NEBS GR-63, Issue 2	Bystander Sound Pressure: 54 dBA rear @ 0.6m
Power Supply	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	100 VAC to 240 VAC, autoranging
Current Rating	100–120 VAC 4 A 200-240 VAC 2 A

Table 78: Summit 400-48t specifications

Physical and Environmental	
Dimensions	Height: 1.7 inches (4.3 cm) Width: 17.4 inches (44.2 cm) Depth: 17.0 inches (43.2 cm)
Weight	Weight: 11 lbs (4.98 kg)
Heat Dissipation, Watts/BTU	160 W/0.152 BTU per second
Acoustic Sound	
Sound Power in accordance with EN 300 753 (10-1997)	Sound Power: 56 dBA per ISO 7779 Declared Sound Power: 5.8 belsA per ISO 779 and ISO 9296
Sound Pressure in accordance with NEBS GR-63, Issue 2	Bystander Sound Pressure: 44 dBA rear @ 0.6m
Power Supply	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	100 VAC to 240 VAC, auto-ranging
Current Rating	100-120 VAC 2.0 A 0.5 A 200-240 VAC 1.0 A 0.25A

Summit "*i*" Series Switch Specifications

The Summit "*i*" series has five models, the Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si. Table 79 lists specifications common to all five models. Table 80 lists specifications for each model.

Table 79: Summit "*i*" series common specifications

Safety	
Certifications and Standards	UL 1950 3rd Edition, listed cUL listed to CAN/CSA-C22.2 #950 EN60950:1992 A1-A4, A11:1996 plus deviations IEC950CB, IEC 60950:1991 A1-A4, A11 2nd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Interference/ Compatibility (EMI/EMC)	
Certifications and Standards	FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)

Table 80: Summit “i” series model-specific specifications

Physical Dimensions and Acoustic Sound	**Summit1i** Height: 3.5 inches (8.9 cm) Width: 17.25 inches (43.8 cm) Depth: 19.0 inches (48.3 cm) Weight: 22 lbs (10 kg) **Summit5i** Height: 3.5 inches (8.9 cm) Width: 17.25 inches (43.8 cm) Depth: 19.0 inches (48.3 cm) Weight (single power supply): 21.7 lbs (9.8 kg) Weight (dual power supply): 27.4 lbs (12.4 kg) Acoustic Sound: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 68 dBA per ISO 7779 - Declared Sound Power = 6.8 belsA per ISO 7779 & ISO 9296 **Summit7i** Height: 7.0 inches (17.8 cm) Width: 17.25 inches (43.8 cm) Depth: 19.0 inches (48.3 cm) Weight (single power supply): 45 lbs (20.4 kg) Weight (dual power supply): 55 lbs (24.9 kg) Acoustic Sound: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 68 dBA per ISO 7779 - Declared Sound Power = 6.8 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = 64 dBA rear @ 0.6m **Summit48i** Height: 3.5 inches (8.9 cm) Width: 17.25 inches (43.8 cm) Depth: 19.0 inches (48.3 cm) Weight: 24 lbs (10.8 kg) Acoustic Sound: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 57 dBA per ISO 7779 - Declared Sound Power = 5.9 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 · Bystander Sound Pressure = 49 dBA left @ 0.6m

Table 80: Summit "i" series model-specific specifications (Continued)

	Summit48si
	Height: 1.75 inches (4.45 cm) Width: 17.3 inches (43.9 cm) Depth, including PSU handle: 18.25 inches (46.41 cm) Weight: 14 lbs (6.35 kg) Acoustic Sound: With AC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = High 68 dBA per ISO 7779 Low 60 dBA per ISO 7779 - Declared Sound Power = High 7.0 belsA per ISO 7779 & ISO 9296 Low 6.3 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = High 63 dBA left @ 0.6m Low 54 dBA left @ 0.6m With DC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 62 dBA per ISO 7779 - Declared Sound Power = 6.4 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = High 52 dBA left @ 0.6m
Heat Dissipation	**Summit1i**
	SX—105 W maximum (358 BTU/hr maximum)
	TX—187 W maximum (638 BTU/hr maximum)
	Summit5i
	SX—200 W maximum (683 BTU/hr maximum)
	TX—345 W maximum (1177 BTU/hr maximum)
	LX—200 W maximum (683 BTU/hr maximum)
	Summit7i
	SX—372 W maximum (1270 BTU/hr maximum)
	TX—698 W maximum (2382 BTU/hr maximum)
	Summit48i
	140 W maximum (477 BTU/hr maximum)
	Summit48si
	185 W maximum (631 BTU/hr maximum)
AC Power Supplies	
Summit1i	
AC Line Frequency	50 Hz to 60 Hz
Nominal Operating Voltage	85 VAC to 250 VAC
Current Rating	100-120 VAC 3 A 200-240 VAC 1.5 A
Summit5i	
AC Line Frequency	50 Hz to 60 Hz
Nominal Operating Voltage	100 VAC to 240 VAC
Current Rating	100-120 VAC 4 A 200-240 VAC 2 A
Summit7i	
AC Line Frequency	50 Hz to 60 Hz
Nominal Operating Voltage	90 VAC to 264 VAC

Table 80: Summit “i” series model-specific specifications (Continued)

Current Rating	100-120 VAC 10 A 200-240 VAC 5 A
Summit48i	
AC Line Frequency	50 Hz to 60 Hz
Nominal Operating Voltage	85 VAC to 250 VAC
Current Rating	100-120 VAC 3 A 200-240 VAC 1.5 A
Summit48si	
AC Line Frequency	50 Hz to 60 Hz, auto ranging
Nominal Operating Voltage	100 VAC to 240 VAC
Current Rating	100-120 VAC 3 A 200-240 VAC 1.5 A
DC Power Supplies	
Summit48si	
DC power cable size	14 AWG (2mm^2), high-strand count copper wire
Input power	-40 to -60 V DC
Max input amps	4.2 A
Switch Power-Off	
Temperature power-off	**Summit1i, Summit5i, Summit48i**
	Power-One supplies: 75° to 80° C (167° to 176° F)
	Summit 7i
	Martek supplies: 75° C (167° F)

Alpine 3800 Series Switch Specifications

The Alpine 3800 series switches include the Alpine 3808, Alpine 3804, and Alpine 3802 switches. Table 81 lists specifications common to all Alpine models; Table 82 lists model-specific specifications.

Table 81: Alpine 3800 common specifications

Safety	
Certifications and Standards	UL 1950 3rd Edition, listed Alpine 3802:UL 60950 3rd Edition, listed cUL listed to CAN/CSA-C22.2 No. 60950-00 EN60950:1992 A1-A4, A11:1996 plus deviations IEC950CB, IEC 60950:1991 A1-A4:1996 2nd Edition Alpine 3802: IEC 60950:1999 3rd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH

Table 81: Alpine 3800 common specifications (Continued)

Electromagnetic Interference/ Compatibility (EMI/EMC)	
Certifications and Standards	FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Telecommunications	NEBS/Telcordia, Type IV, Level 3, Issue2 EN/ETSI 300 386-2 v1.1.3 (1997) MIC Telecom

Table 82: Alpine 3800 series model-specific unique specifications

Physical Dimensions and Acoustic Sound	
Alpine Switches	**Alpine 3808** Height: 21 inches (53.30 cm) Width: 17.32 inches (44 cm) Depth: 11.375 inches (28.90 cm) Weight, empty chassis: 50 pounds (22.7 kg) Weight, fully loaded chassis: 98 pounds (44.5 kg) Weight, each power supply: 14 pounds (6.4 kg) Weight, each module: 3 pounds (1.4 kg) Acoustic Sound in Full Chassis: Dual AC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 73 dBA per ISO 7779 - Declared Sound Power = 7.3 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = TBD dBA front @ 0.6m Dual DC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = TBD dBA per ISO 7779 - Declared Sound Power = TBD belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = 68 dBA right @ 0.6m

	Alpine 3804 Height: 10.5 inches (26.65 cm) Width: 17.32 inches (44 cm) Depth: 15.53 inches (39.42 cm) Weight, empty chassis: 30 pounds (13.6 kg) Weight, fully loaded chassis: 68 pounds (30.9 kg) Weight, each power supply: 14 pounds (6.4 kg) Weight, each module: 3 pounds (1.4 kg) Acoustic Sound in Full Chassis: Dual AC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 72 dBA per ISO 7779 - Declared Sound Power = 7.4 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = 66 dBA front @ 0.6m Dual DC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = TBD dBA per ISO 7779 - Declared Sound Power = TBD belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = 64 dBA front @ 0.6m **Alpine 3802** Height: 7 inches (17.78 cm) Width: 17.32 inches (44 cm) Depth: 12 inches (30.48 cm) Weight, empty chassis: 30 pounds (13.6 kg) Weight, fully loaded chassis: 40 pounds (18.1 kg) Weight, each module: 3 pounds (1.4 kg) Acoustic Sound in Full Chassis: Dual AC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 67 dBA per ISO 7779 - Declared Sound Power = 7.0 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = 61 dBA left @ 0.6m Dual DC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 68 dBA per ISO 7779 - Declared Sound Power = 7.0 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = 61 dBA left @ 0.6m
Heat Dissipation	**Alpine 3808** 1046 W maximum (3600 BTU/hr maximum) **Alpine 3804** 577 W maximum (2000 BTU/hr maximum) **Alpine 3802** 315 W maximum (1076 BTU/hr maximum)
Power Supplies	
Alpine 3808	
AC Line Frequency	50 Hz to 60 Hz
Nominal Operating Voltage	90 VAC to 264 VAC, auto-ranging
Current Rating	100-120 VAC 10 A 200-240 VAC 5 A -40 - -70 VDC 30 A

Alpine 3804	
AC Line Frequency	50 Hz to 60 Hz
Nominal Operating Voltage	90 VAC to 264 VAC, auto-ranging
Current Rating	100-120 VAC 5.6 A 200-240 VAC 2.3 A -40 - -70 VDC 16.5 A
Alpine 3802	
AC Line Frequency	50 Hz to 60 Hz
Nominal Operating Voltage	90 VAC to 264 VAC, auto-ranging
Current Rating	100-120 VAC 3.1 A 200-240 VAC 1.3 A -40 - -70 VDC 7.5 A max (-48 VDC 6.5 A)
Switch Power-Off	
Temperature power-off	Martek supplies: 75° C (167° F)

BlackDiamond 6800 Series Switch Specifications

The BlackDiamond 6800 series switches include the BlackDiamond 6816, BlackDiamond 6808, and BlackDiamond 6804 switches. Table 83 lists specifications common to all BlackDiamond models; Table 84 lists model-specific specifications.

Table 83: BlackDiamond 6800 common specifications

Safety	
Certifications and Standards	UL 60950 3rd Edition, listed cUL listed to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC950CB, IEC 60950:2000 3rd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Interference/ Compatibility (EMI/EMC)	
Certifications and Standards	FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Telecommunications	NEBS/Telcordia, Type IV, Level 3, Issue2 EN/ETSI 300 386-2 v1.1.3 (2000) MIC Telecom

Table 84: BlackDiamond 6800 model-specific unique specifications

Physical Dimensions and Acoustic Sound	
BlackDiamond Switches	**BlackDiamond 6816** Height: 61.25 inches (155.6 cm) Width, without rack mount ears: 17.50 inches (44.5 cm) Width, with rack mount ears: 19 inches (48.3 cm) Depth: 19.10 inches (48.51 cm) Weight, empty chassis: 140 lbs (63.5 kg) Weight, fully loaded chassis: 360 lbs (163.3 kg) Weight, each power supply: 30 to 33 lbs (13.6 to 15.0 kg) Weight, each module: 5 lbs (2.3 kg) Acoustic Sound in Full Chassis: Dual AC 110 PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = TBD dBA per ISO 7779 - Declared Sound Power = TBD belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = TBD dBA front @ 0.6m Dual AC 220 PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 71 dBA per ISO 7779 - Declared Sound Power = 7.4 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = 62.7dBA front @ 0.6m Dual DC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = TBD dBA per ISO 7779 - Declared Sound Power = TBD belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = TBD dBA right @ 0.6m **BlackDiamond 6808** Height: 26.25 inches (66.7 cm) Width: 17.32 inches (44 cm) Depth: 18 inches (45.7 cm) Weight, empty chassis: 60 lbs (27.2 kg) Weight, fully loaded chassis: 170 lbs (77.1 kg) Weight, each power supply: 30 to 33 lbs (13.6 to 15.0 kg) Weight, each module: 5 lbs (2.3 kg) Acoustic Sound in Full Chassis: Dual AC 110 PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = TBD dBA per ISO 7779 - Declared Sound Power = TBD belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = TBD dBA front @ 0.6m Dual AC 220 PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = TBD dBA per ISO 7779 - Declared Sound Power = TBD belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = TBD dBA front @ 0.6m Dual DC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 75 dBA per ISO 7779 - Declared Sound Power = 7.7 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 - Bystander Sound Pressure = 67.6 dBA back @ 0.6m

Table 84: BlackDiamond 6800 model-specific unique specifications (Continued)

	BlackDiamond 6804
	Height: 19.25 inches (48.9 cm) Width: 17.32 inches (44 cm) Depth: 19 inches (48.26 cm) Weight, empty chassis: 57.5 lbs (26.1 kg) Weight, fully loaded chassis: 161 lbs (73 kg) Weight, each power supply: 30 to 33 lbs (13.6 to 15.0 kg) Weight, each module: 5 lbs (2.3 kg) Acoustic Sound in Full Chassis: Dual AC 110 PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = TBD dBA per ISO 7779 - Declared Sound Power = TBD belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 · Bystander Sound Pressure = TBD dBA front @ 0.6m Dual AC 220 PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = 70 dBA per ISO 7779 - Declared Sound Power = 7.2 belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 · Bystander Sound Pressure = 63.7 dBA front @ 0.6m Dual DC PS: - Sound Power in accordance with EN 300 753 (10-1997) - Sound Power = TBD dBA per ISO 7779 - Declared Sound Power = TBD belsA per ISO 7779 & ISO 9296 - Sound Pressure in accordance with NEBS GR-63, Issue 2 · Bystander Sound Pressure = TBD dBA back @ 0.6m
Heat Dissipation	**220 VAC Power Supply**
	2544 W maximum (8687 BTU/hr maximum)
	110 VAC Power Supply
	2661 W maximum (9088 BTU/hr maximum)
	-48 DC Power Supply
	2708 W maximum (9246 BTU/hr maximum)
Power Supplies	
220 VAC Power Supply	
AC Line Frequency	50 Hz to 60 Hz
Nominal Operating Voltage	3600 W, 200 VAC to 240 VAC, auto ranging
Current Rating	200 V AC 15 A
Weight	33.0 lbs (15.0 kg)
110 VAC Power Supply	
AC Line Frequency	50 Hz to 60 Hz
Nominal Operating Voltage	100 V AC to 240 VAC, auto ranging
Current Rating	100 V AC 15 A 200 V AC 7.5 A
Weight	33.0 lbs (15.0 kg)
-48 DC Power Supply	
Nominal Operating Voltage	-42 V DC to -70 V DC, auto ranging
Current Rating	-48 V DC 60 A
Weight	31.75 lbs (14.4 kg)
Switch Power-Off	

Table 84: BlackDiamond 6800 model-specific unique specifications (Continued)

Temperature power-off	Original supply, not DC and not high-output: 75° C (167° F)
	DC Supply: Stand-alone: 65° to 70° C (149° to 158° F) In chassis: 70° C (158° F)
	High-output: 75° C (167° F)

EPS-LD Power Supply Specifications

Table 85 lists the electrical specifications for each EPS-LD unit.

Table 85: EPS-LD power supply specifications

Ratings	
Nominal Operating Voltage	115 VAC or 230 VAC
Input Voltage Range	100 VAC to 240 VAC
AC Line Frequency	50 Hz to 60 Hz
Maximum Input Current Rating	10A at 115 VAC, 5A at 230 VAC
Maximum Inrush Current	30A at 115 VAC, 60A at 230 VAC
Output	-50 VDC, 7.5 A max, 375 Watts 12 VDC, 7.5 A max, 90 Watts
EPS-LD Input Connector	IEC320-C14
Maximum continuous DC output	shall not exceed 465 Watts.
Acoustic Sound	
Sound Power in accordance with EN 300 753 (10-1997)	Sound Power: 62 dBA per ISO 7779 Declared Sound Power: 6.5 belsA per ISO 779 and ISO 9296
Sound Pressure in accordance with NEBS GR-63, Issue 2	Bystander Sound Pressure: 54 dBA rear @ 0.6m

Table 86 lists the environmental specifications for each EPS-LD unit.

Table 86: EPS-LD operational environmental specification overview

Ratings	
Ambient Operating Temperature	0 C to +40 C
Storage and Transportation Temperature	-40 C to +70 C
Operating Relative Humidity	10 - 95% noncondensing
Shock—Operational	30 m/s2 (3g)

Power Connector Specifications

Table 87: Pinouts for Summit 300-24 switch redundant power connector

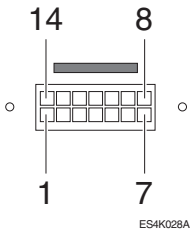
Diagram	Pin	Wire Label
	1	GND
	2	12V
	3	12V
	4	12V
	5	12V
	6	-50 V
	7	-50 V rtn
	8	GND
	9	NC
	10	rps_pres
	11	EXT_CON
	12	status_1
	13	status_2
	14	GND

Figure 178: Three-wire Cable Harness for the Summit 48si DC power supply

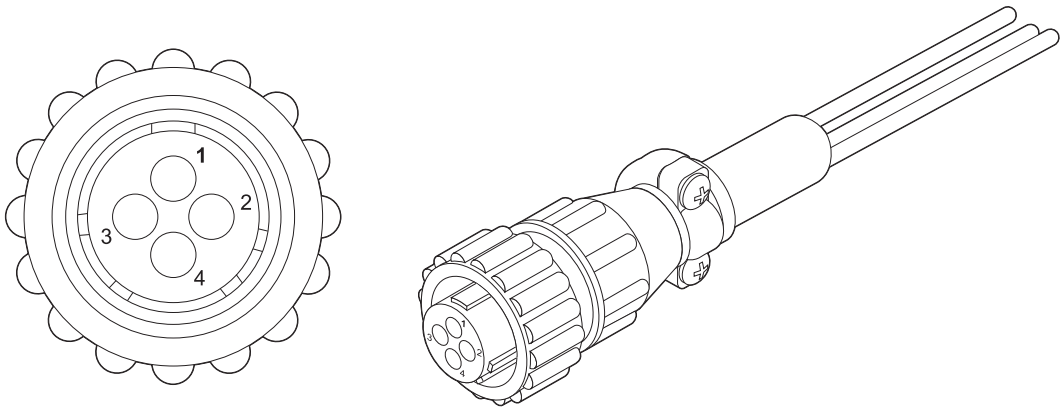
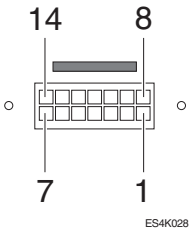
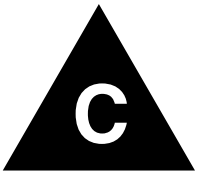


Table 88: Wire-to-pin connection specifications for the Summit 48si DC power cable

Pin	Wire Color	Lead Wire	Wire Label
1	Green/Yellow	Chassis Ground	Chassis Ground
2	Red	Return	Return
3	Black	-48 V	-48 V
4	unused		

Table 89: Connector specifications for the EPS-T redundant power connector

Diagram	Pin	Wire Label
	1	NC
	2	GND
	3	GND
	4	GND
	5	GND
	6	+12 V
	7	+12 V
	8	RS+
	9	GND
	10	INT PG
	11	EXT_CON
	12	EXT_PG
	13	+5 V
	14	+12 V



Module Technical Specifications

This appendix provides the technical specifications for GBICs, mini-GBICs, XENPAKs, and the Alpine and BlackDiamond modules.

GBICs:

- 1000BASE-SX GBIC specifications on page 341
- 1000BASE-LX GBIC specifications on page 341
- ZX GBIC specifications on page 342
- ZX GBIC Rev 03 specifications on page 342
- LX70 GBIC specifications on page 342
- LX100 GBIC specifications on page 342
- UTP GBIC specifications on page 343

Mini-GBICs:

- SX mini-GBIC specifications on page 343
- LX mini-GBIC specifications on page 343
- ZX mini-GBIC specifications on page 344
- 1000BASE-BX mini-GBIC specifications on page 344

XENPAKS:

- SR XENPAK module specifications on page 345
- LR XENPAK module specifications on page 345
- ER XENPAK module specifications on page 345
- ZR XENPAK module specifications on page 346
- LX4 XENPAK module specifications on page 347
- CX4 XENPAK on page 348

Alpine modules:

- SMMi module specifications on page 348
- GM-4Ti, GM-4Xi, and GM-4Si module specifications on page 348
- GM-16X^3 and GM-16T^3 module specifications on page 350
- FM-32Ti and FM-24Ti module specifications on page 351

- FM-24SFi and FM-24MFi module specifications on page 352
- FM-8Vi module specifications on page 353
- WM-4T1i and WM-4E1i module specifications on page 355
- WM-1T3i module specifications on page 356

BlackDiamond modules:

- MSM specifications on page 357
- G8Xi, G8Ti, and G12SXi module specifications on page 358
- G16X^3 and G24T^3 module specifications on page 359
- F48Ti and F96Ti module specifications on page 360
- F32Fi module specifications on page 363
- PoS module specifications on page 364
- ARM module specifications on page 365
- MPLS module specifications on page 366
- ATM module specifications on page 367

Specifications common to all modules:

- Common Module Specifications on page 368

The technical specifications for the Alpine modules are listed in Table 107 through Table 119. The technical specifications for the BlackDiamond modules are listed in Table 120 through Table 132. Specifications common to all modules are listed in Table 134.

GBIC Specifications

Table 90 describes the media types and associated maximum distances for each GBIC type.

Table 90: GBIC types and maximum distances

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
SX (850 nm optical window)	50/125 µm multimode fiber	400	500
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	160	220
	62.5/125 µm multimode fiber	200	275
LX (1310 nm optical window)	50/125 µm multimode fiber	400	550
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	500	550
	10/125 µm single-mode fiber	–	5,000
	10/125 µm single-mode fiber*	–	10,000
ZX (1550 nm optical window)	10/125 µm single-mode fiber	–	50,000
ZX Rev 03 (1550 nm optical window)	10/125 µm single-mode fiber		70,000

Table 90: GBIC types and maximum distances (Continued)

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
LX70 (1550 nm optical window)	10/125 µm single-mode fiber	–	70,000
LX100 (1550 nm optical window)	10/125 µm single-mode fiber		100,000
UTP	Category 5 UTP cable	–	80

*Extreme Networks proprietary. Connections between two Extreme Networks 1000BASE-LX interfaces can use a maximum distance of 10,000 meters.

Table 91 through Table 96 list the specifications for each GBIC type.

Table 91: 1000BASE-SX GBIC specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-9.5 dBm		-4 dBm
Center wavelength	830 nm	850 nm	860 nm
Receiver			
Optical input power sensitivity	-17 dBm		
Optical input power maximum			0 dBm
Operating wavelength	770 nm		860 nm

Table 92: 1000BASE-LX GBIC specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-11 dBm		-3 dBm
Center wavelength	1270 nm	1310 nm	1355 nm
Receiver			
Optical input power sensitivity	-19 dBm		
Optical input power maximum			-3 dBm
Operating wavelength	1270 nm		1355 nm

The ZX GBIC and ZX Rev 03 GBIC have minor differences in their specifications, as noted in Table 93 and Table 94. To identify the ZX Rev 03 module, look for one of the following on the label:

- DVA-1203 sticker near the top of the label that covers the Extreme Networks logo
- ZX GBIC (1203) text near the top of the label
- ZX GBIC Rev 03 text near the center of the label

Table 93: ZX GBIC specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-4 dBm	-3 dBm	-1 dBm
Center wavelength	1540 nm	1550 nm	1570 nm
Receiver			
Optical input power sensitivity	-23.5 dBm		
Optical input power maximum			-1 dBm
Operating wavelength	1540 nm	1550 nm	1570 nm

Table 94: ZX GBIC Rev 03 specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-2 dBm	0 dBm	2 dBm
Center wavelength	1540 nm	1550 nm	1570 nm
Receiver			
Optical input power sensitivity	-23 dBm		
Optical input power maximum			-1 dBm
Operating wavelength	1540 nm	1550 nm	1570 nm

Table 95: LX70 GBIC specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	0 dBm	3 dBm	5.2 dBm
Center wavelength	1540 nm	1550 nm	1570 nm
Receiver			
Optical input power sensitivity	-22 dBm		
Optical input power maximum			-3 dBm
Operating wavelength	1270 nm		1570 nm

Table 96: LX100 GBIC specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	1 dBm	3 dBm	5 dBm
Center wavelength	1546 nm	1551 nm	1557 nm
Receiver			

Table 96: LX100 GBIC specifications (Continued)

Parameter	Minimum	Typical	Maximum
Optical input power sensitivity	-29 dBm		
Optical input power maximum			-7 dBm
Operating wavelength	1546 nm	1551 nm	1557 nm

Table 97: UTP GBIC specifications

Media Type	Bit Error Rate (Errors per Second)	Data Rate	Min Distance (Meters)	Max Distance (Meters)
Category 5 UTP cable	10^{-12}	1 Gbps	2	80

Mini-GBIC Specifications

Table 98 through Table 100 list the specifications for the mini-GBICs.

Table 98: SX mini-GBIC specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-9.5 dBm		-4 dBm
Center wavelength	830 nm	850 nm	860 nm
Receiver			
Optical input power sensitivity	-21 dBm		
Optical input power maximum			-4 dBm
Operating wavelength	830 nm		860 nm
General			
Total system budget			11.5 dB

Table 99: LX mini-GBIC specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-9.5 dBm		-3 dBm
Center wavelength	1275 nm	1310 nm	1355 nm
Receiver			
Optical input power sensitivity	-23 dBm		
Optical input power maximum			-3 dBm
Operating wavelength	1270 nm		1355 nm
General			
Total system budget			13.5 dB

Table 100: ZX mini-GBIC specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-2 dBm	0 dBm	3 dBm
Center wavelength	1540 nm	1550 nm	1570 nm
Receiver			
Optical input power sensitivity	-23 dBm		
Optical input power maximum			-3 dBm
Operating wavelength	1540 nm	1550 nm	1570 nm

NOTE

The 1000Base-BX mini-GBIC consists of two SFP optical devices, the 1000BASE-BX-U mini-GBIC and the 1000BASE-BX-D mini-GBIC, which must be used as a pair to allow for a single fiber bidirectional connection.

Table 101: 1000Base-BX mini-GBIC specifications

Parameter	Minimum	Maximum
Transmitter		
Average launch power	–9 dBm	–3 dBm
Center wavelength (1000BASE-BX10-D)	1260 nm	1360 nm
Center wavelength (1OOOBASE-BX1O-U)	1480 nm	1500 nm
Receiver		
Receiver sensitivity		19 dBm
Average receive power (maximum)		-3 dBm
Link		
Link power budget		8 dB

XENPAK Specifications

NOTE

Use only Extreme Networks-approved XENPAK modules in all Extreme Networks devices.

SR XENPAK

Table 102 describes the specifications for the SR XENPAK module.

Table 102: SR XENPAK module specifications

Parameter	Minimum	Maximum
Average launch power min	-7.3 dBm	
Channel insertion loss: 62.5 µm (160/200 MHz*km) 62.5 µm (200 MHz*km) 50 µm (400 MHz*km) 50 µm (500 MHz*km) 50 µm (2000 MHz*km)		 1.6 dB 1.6 dB 1.7 dB 1.8 dB 2.6 dB
Wavelength range	840 nm	860 nm
Operating distance range (depends on type and modal bandwidth) 62.5 µm MMF (160 MHz*km) 62.5 µm MMF (200 MHz*km) 50 µm MMF (400 MHz*km) 50 µm MMF (500 MHz*km) 50 µm MMF (2000 MHz*km)		 26 m 33 m 66 m 82 m 300 m
Maximum receiver sensitivity in OMA		-11.1 dBm

The SR XENPAK supports multimode fiber (MMF) and has an SC connector.

LR XENPAK

Table 103 describes the specifications for the LR XENPAK module.

Table 103: LR XENPAK module specifications

Parameter	Minimum	Maximum
Average launch power	-7.3 dBm	0.5 dBm
Optical link budget		6.2 dB
Wavelength range	1260 nm	1355 nm
Distance range	2 m	10 km
Maximum receiver sensitivity in OMA		-12.6 dBm

The LR XENPAK supports single-mode fiber (SMF) and has an SC connector.

ER XENPAK

Table 104 describes the specifications for the ER XENPAK module.

Table 104: ER XENPAK module specifications

Parameter	Minimum	Maximum
Average launch power	-4.7 dBm	4.0 dBm
Optical link budget		10.9 dB
Wavelength range	1530 nm	1565 nm

Table 104: ER XENPAK module specifications

Parameter	Minimum	Maximum
Distance range: 5 dBm attentuation	2 m	40 km
Maximum receiver sensitivity in OMA		-14.1 dBm

The ER XENPAK supports SMF and has an SC connector.

ZR XENPAK

Table 105 describes the specifications for the ZR XENPAK module.

Table 105: ZR XENPAK module specifications

Parameter	Minimum	Maximum
Transmitter		
Optical output power	0 dBm	4 dBm
Center wavelength	1530 nm	1565 nm
Receiver		
Optical input power	-22 dBm	-7 dBm
Operating wavelength	1530 nm	1565 nm

Table 105: ZR XENPAK module specifications

Parameter	Minimum	Maximum
General		
Optical link loss	11 dB	22 dB
Optical dispersion	0 ps/nm	1600 ps/nm
Distance		80 km

The ZR XENPAK supports SMF and has an SC connector.

WARNING!

To prevent permanent damage to the ZR XENPAK and other equipment: always check the optical input power of the receiver before inserting the fiber. The maximum optical input power for the receiver is -7 dBm. If you use optical loopback for diagnostics purposes, the loopback requires a minimum of 10 dB optical attenuation. The recommended attenuation range is 10 dB to 15 dB.

LX4 XENPAK

Table 106 describes the specifications for the LX4 XENPAK module.

Table 106: LX4 XENPAK module specifications

Parameter	Minimum	Maximum
Transmitter		
Average launch power, 4 lanes		+ 5.5 dBm
Average launch power, per lane		- 0.5 dBm
Optical modulation amplitude (OMA), per lane: SMF MMF	 - 6.25 dBm - 6.75 dBm	 - 1.25 dBm - 1.25 dBm
Receiver		
Average receive power, 4 lanes		+ 5.5 dBm
Average receive power, per lane		- 0.5 dBm
Receive sensitivity (OMA), per lane		- 14.45 dBm
Optical link budget		
Wavelength range	1269.0 nm	1282.4 nm
	1293.5 nm	1306.9 nm
	1318.0 nm	1331.4 nm
	1342.5 nm	1355.9 nm
Distance range: SMF MMF		 10 km 300 m

The LX4 XENPAK supports multimode fiber (MMF) in intra-building connections and single-mode fiber (SMF) for interbuilding connections and has an SC connector.

CX4 XENPAK

NOTE

CX4 XENPAKs are also supported with Extreme Networks devices; contact your vendor to obtain these.

Alpine Modules

Table 107: SMMi module specifications

Physical Dimensions	
	Height: 1.0 inches (2.5 cm) Width: 16.25 inches (41.3 cm) Depth: 8.0 inches (20.3 cm) Weight: 4 lbs (1.8 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 1950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 950 EN60950:1992 A1-A4, A11:1996 plus deviations IEC950CB, IEC 60950:1991 A1-A4:1996 2nd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (1997)

Table 108: GM-4Ti, GM-4Xi, and GM-4Si module specifications

Physical Dimensions	

Table 108: GM-4Ti, GM-4Xi, and GM-4Si module specifications

	Height: 1.5 inches (3.8 cm) Width: 16.25 inches (41.3 cm) Depth: 8.0 inches (20.3 cm) Weight: 4 lbs (1.8 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 1950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 950 EN60950:1992 A1-A4, A11:1996 plus deviations IEC950CB, IEC 60950:1991 A1-A4:1996 2nd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (1997)

Table 109: GM-4Si module optical specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-9.5 dBm		-4 dBm
Center wavelength	830 nm	850 nm	860 nm
Receiver			
Optical input power sensitivity	-17 dBm		
Optical input power maximum			0 dBm
Operating wavelength	830 nm		860 nm

Table 110: GM-16X^3 and GM-16T^3 module specifications

Physical Dimensions	
	Height: 1.5 inches (3.8 cm) Width: 16.25 inches (41.3 cm) Depth: 8.0 inches (20.3 cm) Weight: 3.75 lbs (1.7 kg) (GM-16X^3 module) Weight: 4 lbs (1.8 kg) (GM-16T^3 module)
Safety	
Certifications and Standards	UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC60950:2000 CB plus deviations TUV-R GS Mark Low Voltage Directive (LVD) AS/NZS 3260 NOM/NYCE S-Mark (Argentina)
Electromagnetic Compatibility (EMC)	
Certifications and Standards	FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A EN55024:1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 CISPR22:1997 Class A CISPR24:1998 ETSI/EN 300 386:2001 EN61000-3-2, 3 CNS 13438:1998 Class A (Taiwan) VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia)
Environmental	EN/ETSI 300 019-2-1:2000 class 1.2 EN/ETSI 300 019-2-2:1999 class 2.3 EN/ETSI 300 019-2-2:1999 class 3.1e ASTM D5276 ASTM D3580 ASTM D3332

Table 111: FM-32Ti and FM-24Ti module specifications

Physical Dimensions	
	Height: 1.5 inches (3.8 cm) Width: 16.25 inches (41.3 cm) Depth: 8.0 inches (20.3 cm) Weight: 4 lbs (1.8 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 1950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 950 EN60950:1992 A1-A4, A11:1996 plus deviations IEC950CB, IEC 60950:1991 A1-A4:1996 2nd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (1997)

Table 112 describes the cable specifications for the Alpine FM-24Ti module.

Table 112: FM-24Ti cable specifications

Connectors	Lucent 525 Telco 50-pin RJ-21
Cable	Shielded trunk cable with 25 CAT5 twisted-pairs
Minimum Length	1 m
Maximum Length	100 m
Maximum Torque (connector screws)	4 inch-pounds

Table 113: FM-24SFi and FM-24MFi module specifications

Physical Dimensions	
	Height: 1.5 inches (3.8 cm) Width: 16.25 inches (41.3 cm) Depth: 8.0 inches (20.3 cm) Weight: 4 lbs (1.8 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 1950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 950 EN60950:1992 A1-A4, A11:1996 plus deviations IEC950CB, IEC 60950:1991 A1-A4:1996 2nd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (1997)

Table 114: FM-24SFi optical interface specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-20 dBm		-14 dBm
Center wavelength	1310 nm		
Receiver			
Optical input power sensitivity	-31 dBm		
Optical input power maximum			-8 dBm
Operating wavelength	1310 nm		
General			
Total system budget			11 dBm

Table 115: FM-24MFi optical interface specifications

Parameter	Minimum	Typical	Maximum
Transceiver			
Optical output power	-20 dBm		-14 dBm
Center wavelength	1310 nm		
Receiver			
Optical input power sensitivity	-31 dBm		
Optical input power maximum			-14 dBm
Operating wavelength	1310 nm		
General			
Total system budget			11 dBm

Table 116: FM-8Vi module specifications

Physical Dimensions	
	Height: 1.5 inches (3.8 cm) Width: 16.25 inches (41.3 cm) Depth: 8.0 inches (20.3 cm) Weight: 5 lbs (2.7 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 1950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 950 EN60950:1992 A1-A4, A11:1996 plus deviations IEC950CB, IEC 60950:1991 A1-A4:1996 2nd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (1997)

The connector on the FM-8Vi requires a male terminated RJ-21 cable. The FM-8Vi uses 8 of the 25 pairs in the cable. Because the RJ-21 standard was established for telecommunications, one wire of each pair is designated as the tip side and the other wire is designated as the ring side.

Table 117 lists the pin numbers on the connector, the color code for the wires, and the associated port number for the wire pair.

Table 117: RJ-21 connector and wire pairs

VDSL Port	Ring Side Pin Number/Wire Color	Tip Side Pin number/Wire Color
1	1 blue white	26 white blue
2	2 orange white	27 white orange
3	3 green white	28 white green
4	4 brown white	29 white brown
5	5 slate white	30 white slate
6	6 blue red	31 red blue
7	7 orange red	32 red orange
8	8 green red	33 red green

Table 118: WM-4T1i and WM-4E1i module specifications

Physical Dimensions	
	Height: 1.5 inches (3.8 cm) Width: 16.25 inches (41.3 cm) Depth: 8.0 inches (20.3 cm) Weight: 5 lbs (2.7 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 1950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 950 EN60950:1992 A1-A4, A11:1996 plus deviations IEC950CB, IEC 60950:1991 A1-A4:1996 2nd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan) Low Voltage Directive (LVD)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (1997) T1: FCC CFR 47 Part 68 T1: CAN/CS-03 (Canada) T1: JATA Green Book (Japan) E1: CTR 12/13 (Europe)

Table 119: WM-1T3i module specifications

Physical Dimensions	
	Height: 1.5 inches (3.8 cm) Width: 16.25 inches (41.3 cm) Depth: 8.0 inches (20.3 cm) Weight: 5 lbs (2.7 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 1950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 950 EN60950:1992 A1-A4, A11:1996 plus deviations IEC950CB, IEC 60950:1991 A1-A4:1996 2nd Edition Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (1997)

BlackDiamond Modules

Table 120: MSM specifications

Physical Dimensions	
	Height: 1.6 inches (4.1 cm) Width: 15.1 inches (38.4 cm) Depth: 16.0 inches (40.6 cm) Weight: 6.25 lbs (2.81 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC950CB, IEC 60950:1999 Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (2000)

Table 121: G8Xi, G8Ti, and G12SXi module specifications

Physical Dimensions	
	Height: 1.6 inches (4.1 cm) Width: 15.1 inches (38.4 cm) Depth: 16.0 inches (40.6 cm) Weight: 6.25 lbs (2.81 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC950CB, IEC 60950:1999 Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (2000)

Table 122: G16X^3 and G24T^3 module specifications

Physical Dimensions	
	Height: 1.6 inches (4.1 cm) Width: 15.1 inches (38.4 cm) Depth: 16.0 inches (40.6 cm) Weight: 7.5 lbs (2.81 kg)
Safety	
Certifications and Standards	UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC60950:2000 CB plus deviations TUV-R GS Mark Low Voltage Directive (LVD) AS/NZS 3260 NOM/NYCE S-Mark (Argentina) EN60825-1 (G16X^3 only) FCC 21 CFR subpart J (G16X^3 only) CDRH (G16X^3 only)
Electromagnetic Compatibility (EMC)	
Certifications and Standards	FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A EN55024:1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 CISPR22:1997 Class A CISPR24:1998 ETSI/EN 300 386:2001 EN61000-3-2, 3-3 CNS 13438 Class A (Taiwan) VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia)
Environmental	EN/ETSI 300 019-2-1:2000 class 1.2 EN/ETSI 300 019-2-2:1999 class 2.3 EN/ETSI 300 019-2-2:1999 class 3.1e ASTM D5276 ASTM D3580 ASTM D3332

Performance criteria are:

- A—Unit continues to function with maximum of 10% traffic loss, 10% CRC errors during the application of interference and recovers without operator intervention.
- B—Unit continues to function after the test without operator intervention.
- C—Temporary loss of function is permitted, provided the function is self-recoverable or can be recovered by the operation of controls

Table 123: F48Ti and F96Ti module specifications

Physical Dimensions	
	Height: 1.6 inches (4.1 cm) Width: 15.1 inches (38.4 cm) Depth: 16.0 inches (40.6 cm) Weight: 6.25 lbs (2.81 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC950CB, IEC 60950:1999 Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (2000)

The RJ-21 port is shown in Figure 179.

Figure 179: One RJ-21 port yields 12 10/100 ports

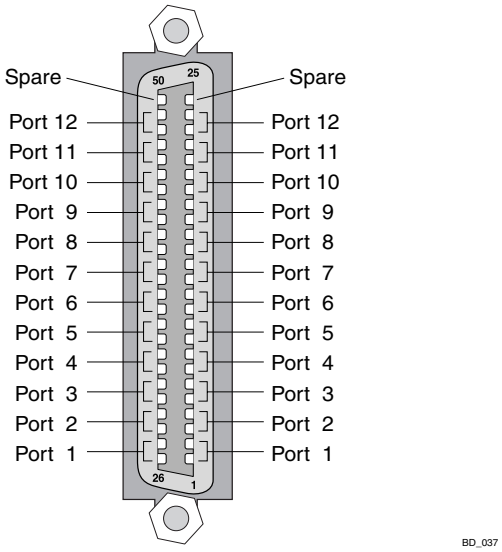


Table 124 describes the pinouts for the RJ-21 port.

Table 124: Connector pinouts for the RJ-21 port

RJ-45 Number	RJ-21 Pin Numbers	RJ-45 Pin Numbers
1	1, 2, 26, 27	2, 6, 1, 3
2	3, 4, 28, 29	2, 6, 1, 3
3	5, 6, 30, 31	2, 6, 1, 3
4	7, 8, 32, 33	2, 6, 1, 3
5	9, 10, 34, 35	2, 6, 1, 3
6	11, 12, 36, 37	2, 6, 1, 3
7	13, 14, 38, 39	2, 6, 1, 3
8	15, 16, 40, 41	2, 6, 1, 3
9	17, 18, 42, 43	2, 6, 1, 3
10	19, 20, 44, 45	2, 6, 1, 3
11	21, 22, 46, 47	2, 6, 1, 3
12	23, 24, 48, 49	2, 6, 1, 3

Table 125 describes the output signals for the RJ-21 connector.

Table 125: Output signals for the RJ-21 connector

RJ-21 Pin Numbers	Output Signal	RJ-21 Pin Numbers	Output Signal
1	RxD (-)	26	RxD (+)
2	TxD (-)	27	TxD (+)
3	RxD (-)	28	RxD (+)
4	TxD (-)	29	TxD (+)
5	RxD (-)	30	RxD (+)
6	TxD (-)	31	TxD (+)
7	RxD (-)	32	RxD (+)
8	TxD (-)	33	TxD (+)
9	RxD (-)	34	RxD (+)
10	TxD (-)	35	TxD (+)
11	RxD (-)	36	RxD (+)
12	TxD (-)	37	TxD (+)
13	RxD (-)	38	RxD (+)
14	TxD (-)	39	TxD (+)
15	RxD (-)	40	RxD (+)
16	TxD (-)	41	TxD (+)
17	RxD (-)	42	RxD (+)
18	TxD (-)	43	TxD (+)
19	RxD (-)	44	RxD (+)
20	TxD (-)	45	TxD (+)
21	RxD (-)	46	RxD (+)
22	TxD (-)	47	TxD (+)
23	RxD (-)	48	RxD (+)
24	TxD (-)	49	TxD (+)

Table 126: F96Ti cable specifications

Connectors	Lucent 525 Telco 50-pin RJ-21
Cable	Shielded trunk cable with 12 CAT5 twisted pairs
Minimum Length	1 meter
Maximum Length	100 meters
Maximum Torque	4 in-lbs

Table 127: F32Fi module specifications

Physical Dimensions	
	Height: 1.6 inches (4.1 cm) Width: 15.1 inches (38.4 cm) Depth: 16.0 inches (40.6 cm) Weight: 5.0 lbs (2.27 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC950CB, IEC 60950:1999 Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (2000)

Table 128: PoS module specifications

Physical Dimensions	
	Height: 1.6 inches (4.1 cm) Width: 15.1 inches (38.4 cm) Depth: 16.0 inches (40.6 cm) Weight: 5.25 lbs (2.38 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC950CB, IEC 60950:1999 Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (2000)

Table 129 lists the specifications for the P3cSi, P3cMi, P12cSi, and P12cMi optical interfaces.

Table 129: Optical interface specifications for the PoS modules

Parameter	P3cSi	P3cMi	P12cSi	P12cMi
Power budget	13 dB	9 dB	13 dB	10 dB
Operating wavelength	1310 nm	1310 nm	1310 nm	1310 nm
Transmit distance	15 km (9.32 mi)	2 km (1.24 mi)	15 km (9.32 mi)	500 m (0.31 mi)

Table 130: ARM module specifications

Physical Dimensions	
	Height: 1.6 inches (4.1 cm) Width: 15.1 inches (38.4 cm) Depth: 16.0 inches (40.6 cm) Weight: 5.25 lbs (2.38 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC950CB, IEC 60950:1999 Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (2000)

Table 131: MPLS module specifications

Physical Dimensions	
	Height: 1.6 inches (4.1 cm) Width: 15.1 inches (38.4 cm) Depth: 16.0 inches (40.6 cm) Weight: 5.25 lbs (2.38 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC950CB, IEC 60950:1999 Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (2000)

Table 132: ATM module specifications

Physical Dimensions	
	Height: 1.6 inches (4.1 cm) Width: 15.1 inches (38.4 cm) Depth: 16.0 inches (40.6 cm) Weight: 5.25 lbs (2.38 kg)
Safety	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 UL 60950 3rd Edition, listed accessory cUL listed accessory to CAN/CSA-C22.2 No. 60950-00 EN60950:2000 plus deviations IEC950CB, IEC 60950:1999 Low Voltage Directive (LVD) AS/NZS 3260 S-Mark (Argentina) EN60825-1 + A11:1996 FCC CFR 21, CDRH
Electromagnetic Compatibility (EMC)	
Certifications and Standards	NEBS/Telcordia, Type IV, Level 3, GR-1089 Issue2 FCC CFR 47 Part 15 Class A CAN/ICES-003 Class A 89/336/EEC EMC Directive EN55022:1998 Class A CISPR22:1997 Class A EN55024:1998 includes IEC 6100-4-2, 3, 4, 5, 6, 11 EN6100-3-2, 3-3 VCCI Class A (Japan) AS/NZS 3548 (Australia/New Zealand) NOM/NYCE (Mexico) MIC Mark (Korea) GOST (Russia) CNS 13438 Class A (Taiwan)
Environmental	NEBS/Telcordia, Type IV, Level 3, GR-63 Issue2 EN/ETSI 300 019
Telecommunications	NEBS/Telcordia, Type IV, Level 3, GR-1089, GR-63 EN/ETSI 300 386-2 v1.1.3 (2000)

Table 133 lists the specifications for the A3cSi optical interface.

Table 133: Optical interface specifications for the ATM modules

Parameter	A3cSi	A3cMi
Power budget	13 dB	9 dB
Operating wavelength	1310 nm	1310 nm
Transmit distance	15 km (9.32 mi)	2 km (1.24 mi)

Common Module Specifications

Table 134 describes the specifications common to all modules.

Table 134: Common module specifications

Environmental Requirements	
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-40° to 70° C (-40° to 158° F)
Operating Humidity	10% to 95% relative humidity, noncondensing

D Installing GBICs and Mini-GBICs

GBIC and mini-GBIC interfaces provide installable high-performance ports for Extreme Networks switches. GBICs can be installed in the following switches:

- Summit1i
- Summit5i
- Summit7i
- Summit48i

Mini-GBICs can be installed in the following switches:

- Summit 200 “e” series
- Summit 300 “e” series
- Summit 400 “e” series
- Summit 48si

This appendix provides installation instructions for GBICs and mini-GBICs.

Installing GBICs

GBICs are available in the following media types:

- SX
- LX, LX70, and LX100
- ZX
- UTP (supported only on “*i*” series switches)

Requirements for the LX100 GBIC

This section describes the requirements for the LX100 GBIC. Read the information in this section before you install an LX100 GBIC.

If you have an Alpine 3800 series switch populated with a GM-4Xi module, do one of the following:

- Install a maximum of three LX100 GBICs per GM-4Xi module; the fourth GBIC slot must remain empty.
- Install two or fewer LX100 GBICs per GM-4Xi module, and leave the remaining GBIC slots empty.
- Install two or fewer LX100 GBICs per GM-4Xi module, and install any combination of the following GBICs into the empty slots:
  - 1000BASE-SX
  - 1000BASE-LX
  - ZX GBIC
  - ZX Rev 03
  - LX70
  - UTP GBIC

To ensure correct operation of the LX100 GBIC, make sure you run ExtremeWare 6.1.9 or later on your switch.

Requirements for the UTP GBIC

The UTP GBIC operates in full-duplex mode only. The UTP GBIC does not operate in 10/100 Mbps mode, and it does not support autonegotiation of link speed.

You must disable autonegotiation on the ports that use the UTP GBIC and manually configure the port speed to 1000 Mbps.

The following example disables autonegotiation, configures a port speed of 1000 Mbps, and specifies full-duplex mode for port 4 on a stand-alone switch:

```
config ports 4 auto off speed 1000 duplex full
```

The following example disables autonegotiation, configures a port speed of 1000 Mbps, and specifies full-duplex mode for port 1 on a G8Xi module located in slot 1 of a modular switch:

```
config ports 1:1 auto off speed 1000 duplex full
```

The UTP GBIC is supported on "*i*" series products only.

Safety Information

Before you install or replace a GBIC, read the safety information in this section.

CAUTION

GBICs can emit invisible laser radiation. Avoid direct eye exposure to the beam when fiber optic connections are unplugged.

NOTE

Compliance Information: Compliant with EN60825-1+A2:2001 for European Union; Compliant with FCC 21 CFR Chapter 1, Subpart; Class 1 Laser Product; Refer to switch or I/O module specific documentation for further compliance information when this optic device is installed within a system.

CAUTION

Use only Extreme-approved optic devices within Extreme switches. Optical modules provided by Extreme Networks are compliant for use with Extreme systems.

Disconnect the fiber-optic or UTP cable from the GBIC before removing the GBIC from the I/O module or the switch.

Preparing to Install or Replace a GBIC

CAUTION

GBICs can emit invisible laser radiation. Avoid direct eye exposure to the beam.

To ensure proper installation, complete the following tasks before inserting the GBIC:

1. Inspect and clean the fiber tips, coupler, and connectors.
2. Prepare and clean an external attenuator, if needed.
3. Calculate the link budget.

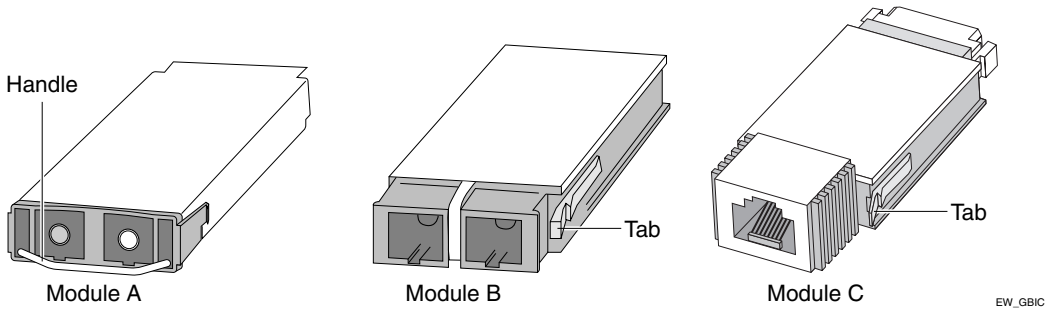
In addition to these tasks, Extreme Networks recommends the following when installing or replacing GBICs on an active network:

- Use the same type of GBIC at each end of the link.
- Connect one end of the link to the Tx port. Without an attenuator, measure the total loss from the Tx port to the other site of the link. The total loss must not exceed the total optical system budget listed in Figure 14 on page 55.
- Use dispersion shifted fiber whenever possible. This provides superior performance in the 1550 nm range.
- When you handle fiber optic cable, do not stretch the fiber.
- Make sure the bend radius of the fiber is not less than 2 inches.

Installing or Replacing a GBIC

You can add and remove GBICs from a Extreme Networks switch without powering off the system. Figure 180 shows the three types of GBICs.

Figure 180: GBIC types



CAUTION

Use only Extreme-approved optic devices within Extreme switches. Optical modules provided by Extreme Networks are compliant for use with Extreme systems.

To insert a GBIC:

1. Holding the GBIC by its sides, insert the GBIC into the slot on the I/O module or the switch.
2. Slide the GBIC into the slot until you hear an audible click, indicating the GBIC is securely seated. If the GBIC has a handle, push down on the handle to secure the GBIC.

NOTE

Remove the SC fiber-optic or the RJ-45 connector from the GBIC before removing the GBIC from the I/O module or the switch.

To remove a GBIC similar to the one labeled “Module A” in Figure 180, rotate the front handle up and pull the GBIC out of the slot.

To remove a GBIC similar to one labeled “Module B” or “Module C” in Figure 180, squeeze the side tabs to release the GBIC, and pull the GBIC out of the slot.

Installing Mini-GBICs

The following types of mini-GBIC interfaces are available:

- SX mini-GBIC, which conforms to the 1000BASE-SX standard
- LX mini-GBIC, which conforms to the 1000BASE-LX standard
- ZX mini-GBIC, which conforms to the IEEE 802.3z standard
- 1000BX bidirectional mini-GBIC, which conforms to the IEEE 802.3ah standard:
  - 1000-Base-BX-U, 1490 nm TX/1310 nm RX wavelength
  - 1000-Base-BX-D, 1310 nm TX/1490 nm RX wavelength

Use only Extreme Networks-certified mini-GBICs, available from Extreme Networks, in the mini-GBIC port in the switch or module.

Safety Information

Before you begin to install or replace a mini-GBIC, read the safety information in this section.

NOTE

Compliance Information: Compliant with EN60825-1+A2:2001 for European Union; Compliant with FCC 21 CFR Chapter 1, Subpart; Class 1 Laser Product; Refer to switch or I/O module specific documentation for further compliance information when this optic device is installed within a system.

CAUTION

Mini-GBICs can emit invisible laser radiation. Avoid direct eye exposure to the beam.

Use only Extreme-approved optic devices within Extreme switches. Optical modules provided by Extreme Networks are compliant for use with Extreme systems.

Preparing to Install or Replace a Mini-GBIC

To ensure proper installation, complete the following tasks before inserting the mini-GBIC:

1. Disable the port that is needed to install or replace the mini-GBIC.
2. Inspect and clean the fiber tips, coupler, and connectors.
3. Prepare and clean an external attenuator, if needed.

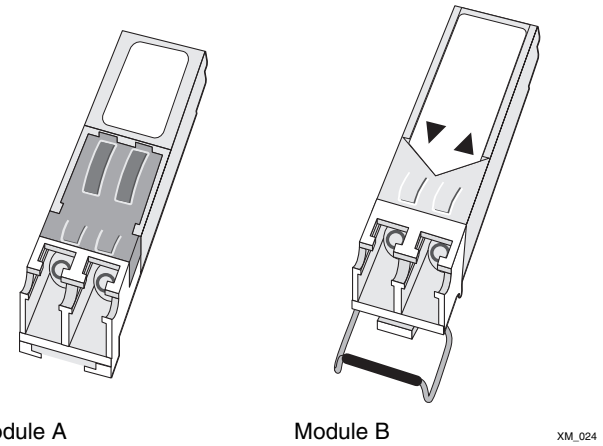
In addition to these tasks, Extreme Networks recommends the following when installing or replacing mini-GBICs on an active network:

- Use the same type of mini-GBIC at each end of the link.
- Connect one end of the link to the Tx port. Without an attenuator, measure the total loss from the Tx port to the other site of the link. The total loss must not exceed the total optical system budget.
- When you handle fiber optic cable, do not stretch the fiber.
- Make sure the bend radius of the fiber is not less than 2 inches (5.08 cm).

Installing or Replacing a Mini-GBIC

You can install or replace mini-GBICs in a Summit 400-48t switch, Summit48si switch, BlackDiamond G16X^3 module, or Alpine GM-16X^3 module without powering off the system. Figure 181 shows the two types of mini-GBICs.

Figure 181: Mini-GBIC modules



CAUTION

Mini-GBICs can emit invisible laser radiation. Avoid direct eye exposure to the beam.

NOTE

Mini-GBICs can be installed only in the SFP mini-GBIC receptacles.

To insert a mini-GBIC:

1. Holding the mini-GBIC by its sides, insert the mini-GBIC into the SFP receptacle on the switch or module.
2. Slide the mini-GBIC into the SFP receptacle until you hear a click, indicating that the mini-GBIC is securely seated in the SFP receptacle.
3. If the mini-GBIC has a handle, push up on the handle to secure the mini-GBIC.

If the mini-GBIC port status LED is blinking amber on a Summit48si switch, a BlackDiamond G16X^3 module, or an Alpine GM-16X^3 module, the mini-GBIC installed in the switch or module is not approved, supported, or certified by Extreme Networks. To correct this problem, install an Extreme Networks-certified mini-GBIC.

If you install a mini-GBIC not certified by Extreme Networks in an Alpine GM-16X^3 module and connect a cable to bring up the link, the port status LED remains off and an error specifying the use of a non-Extreme Networks-certified mini-GBIC is sent to the syslog. To view the syslog and to determine why the link is down, use the `show log` command. To correct this problem, install an Extreme Networks-certified mini-GBIC, available from Extreme Networks.

NOTE

Disconnect the fiber-optic cable from a mini-GBIC before removing the mini-GBIC from the switch.

To remove a mini-GBIC similar to Module A in Figure 181, press and hold the black plastic tab at the bottom of the connector to release the mini-GBIC, and pull the mini-GBIC out of the SFP receptacle.

To remove a mini-GBIC similar to Module B in Figure 181, rotate the front handle and pull the mini-GBIC out of the SFP receptacle.

NOTE

When removing a mini-GBIC (SFP) from a Summit 400 series switch, be sure to disconnect the fiber cable to the mini-GBIC or link before you remove the mini-GBIC itself. It is important to follow this disconnection and removal order. If you do not, the mini-GBIC LED may remain lit even though the mini-GBIC is no longer present. To recover from this LED error mode if the mini-GBIC was incorrectly removed, reinsert the mini-GBIC into the port, disconnect the fiber cable, and remove the mini-GBIC.

E Installing the Summit Option Card and XENPAK Modules

The Summit XEN Card or XGM-2xn Option Card is an additional card that adds one or two 10 Gigabit uplink modules to the back of the Summit 400-48t switch. Two models of the Summit option card are available:

- Summit XEN Card
- Summit XGM-2xn Card

The Summit option card supports any of these Extreme XENPAK optical transceivers:

- SR XENPAK, operating in the 850 nm range
- LR XENPAK, operating in the 1310 nm range
- ER XENPAK, operating in the 1550 nm range
- ZR XENPAK, operating in the 1550 nm range
- LX4 XENPAK, operating in the 1310 nm range

NOTE

CX4 XENPAKs are also supported with Extreme Networks devices; contact your vendor to obtain these.

NOTE

For XENPAK module specifications, see Module Technical Specifications on page 339.

NOTE

Use only Extreme Networks-approved XENPAK modules in all Extreme Networks devices.

Because of power and thermal limitations, the use of ZR XENPAKS in the XGM-2xn Option Card is limited to one of the configurations listed in Table 135.

Table 135: ZR XENPAK Combinations

Left Slot	Right Slot
ZR XENPAK	Empty

Table 135: ZR XENPAK Combinations

Left Slot	Right Slot
ZR XENPAK	SR XENPAK

This appendix provides instructions to install the option card and the uplink module.

NOTE

The Summit XGM-2xn Option Card requires ExtremeWare 7.4 or later. Be sure to upgrade your Summit switch to ExtremeWare 7.4 (or later) before you install a Summit XGM-2xn Option Card. Installing a XGM-2xn Option Card without the correct supporting software might prevent the switch from booting.

Installing the Summit Option Card

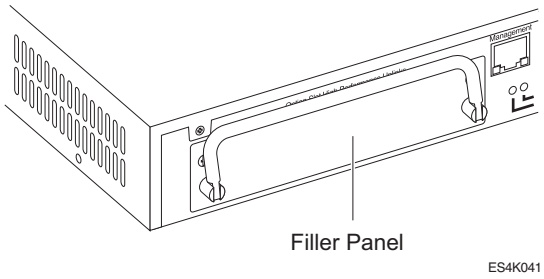
CAUTION

The Summit option card cannot be hot-swapped. Before installing the Summit option card in the Summit 400-48t switch, you must turn off the switch. Use only XENPAK modules approved by Extreme Networks.

To install the Summit option card:

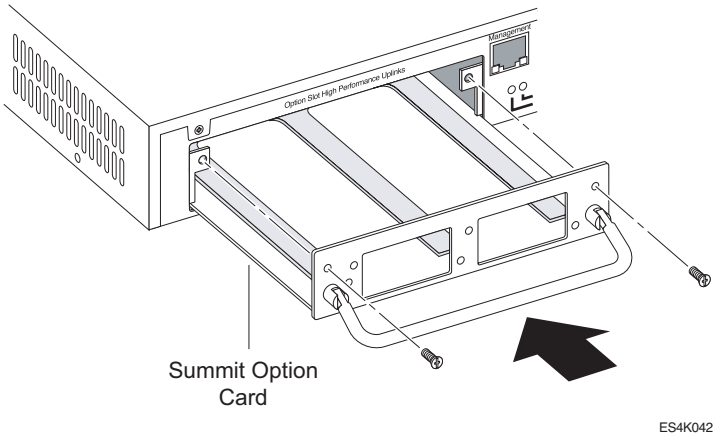
1. If you are installing a Summit XGM-2xn Option Card, upgrade the software in your switch to ExtremeWare 7.4 (or later).
2. Disconnect the AC power from the Summit switch.
3. Using a number 1 Phillips screwdriver, remove the filler panel from the option slot on the back of the switch (Figure 182). Save the screws for re-use.

Figure 182: Removing the option slot filler panel



4. Align the edges of the sheet metal with the card guides, and carefully slide the option card into the switch housing until the connectors engage and the option card is flush with the back panel of the switch (Figure 183).

Figure 183: Installing the Summit XGM-2xn option card



5 Using the screws from the cover plate, secure the option card to the back panel of the switch.

6 Install the XENPAK optical transceiver modules as described in the next section, "Installing a XENPAK Optical Transceiver Module".

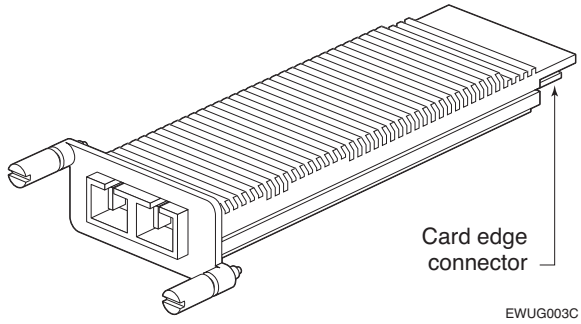
CAUTION

Be sure that the option slot always has either an installed Summit option card or a faceplate over the opening. An opening could divert air from the switch and cause overheating.

Installing a XENPAK Optical Transceiver Module

This section describes installing and removing the XENPAK module, a 10 Gbps optical transceiver. The LR XENPAK and the ER XENPAK look alike and install the same. An example of a XENPAK module is shown in Figure 184.

Figure 184: XENPAK Modules



CAUTION

Use only Extreme-approved optic devices within Extreme switches. Optical modules provided by Extreme Networks are compliant for use with Extreme systems.

CAUTION

The XENPAK module can emit invisible laser radiation. Avoid direct eye exposure to the beam when fiber optic connections are unplugged.

NOTE

Compliance Information: Compliant with EN60825-1+A2:2001 for European Union; Compliant with FCC 21 CFR Chapter 1, Subpart; Class 1 Laser Product; Refer to switch or I/O module specific documentation for further compliance information when this optic device is installed within a system.

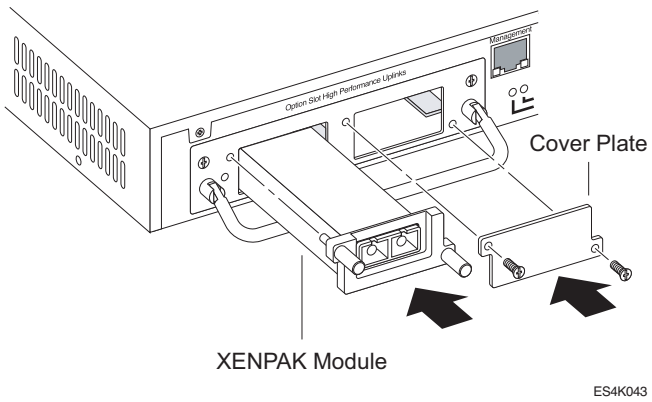
WARNING!

To prevent ESD damage to the Summit 400-48t, always use an ESD-preventive wrist strap when installing or removing the module. Handle the module by its sides only. Never touch the card-edge connectors at the insertion end of the module.

To install XENPAK modules:

1 Hold the module by its sides and insert it into one of the two slots on the Summit option card (Figure 185).

Figure 185: Installing a XENPAK module



2 Slide the XENPAK module as far into the slot as possible, until you hear it click, indicating that it is firmly attached.

3 Secure the XENPAK module to the option card by turning the captive screws clockwise until they are hand-tight.

4 Store the antistatic container, dust covers, and card-edge connector protective pad in a clean location in case you need to remove the XENPAK module.

5 Remove the dust covers from the module connectors before you connect cables.

6 If only one XENPAK module is installed, attach a supplied cover plate over the other module slot.

NOTE

To ensure that your module is undamaged upon installation, you can correlate factory test data with your installation site test data by consulting the average power reference values shown on the XENPAK module test data sheet (Part No. 121074-00) enclosed with your module.

Removing a XENPAK Module

To remove a XENPAK module:

1. Disconnect the fiber-optic cable from the XENPAK module and install dust covers over the module connectors.

   WARNING!

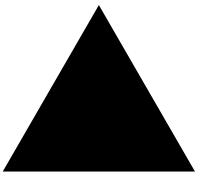
   Disconnect the fiber-optic cable from the XENPAK module before removing the module from the Summit option card.

2. Turn the two captive screws counter-clockwise until they are completely free from the XGM-2xn card.

   WARNING!

   XENPAK modules become very hot after prolonged use. Take care when removing a XENPAK from the chassis. If the module is too hot to touch, disengage the module and allow it to cool before removing it completely.

3. Holding both captive screws, pull the XENPAK module out of the card.
4. Place the dust covers back into the XENPAK module connectors.
5. Place the XENPAK module immediately into an antistatic container to protect it from ESD damage and dust.
6. If you are not installing another XENPAK module, cover the opening with a cover plate.



Index

Numerics

10 Gigabit uplinks 82, 86, 377
10GX3 module 264

A

A3cMi module, *See* ATM module
A3cSi module, *See* ATM module
AC power socket
  Summit 200 switches 62
  Summit 300-24 switch 67
  Summit 300-48 switch 71
  Summit 400-24 switches 77
  Summit 400-48t switch 82
Accounting and Routing Module, *See* ARM
acoustic sound
  Summit 200-24 switch 321
  Summit 200-48 switch 321
  Summit 300-24 switch 323
  Summit 300-48 switch 323
  Summit 400-24p switch 326
  Summit 400-24t switch 326
  Summit 400-48t switch 327
  Summit48i 328
  Summit48si 329
  Summit5i 328
  Summit7i 328
agency certifications
  Alpine 3800 series switch 330
  BlackDiamond 6800 series switch 333
  Summit "i" series switch 327
  Summit 300-48 switch 324
airflow requirements 31
Alpine 3802 switch
  checking the installation (DC) 168
  configure switch command 147
  DC cabling 167, 168
  fan tray 146
  front view 147
  grounding 156
  installing the chassis 153
  LEDs 148
  MAC address 149, 150
  power supply specifications 333
  rear view, AC 149
  rear view, DC 149
  removing the chassis from a rack 157
  serial number 149, 150
Alpine 3804 chassis
  grounding 156
Alpine 3804 switch
  AC power supply 160
  DC cabling 163, 166
  DC power supply 164
  fan tray 144
  fan tray installation 211
  front view 145
  installing the chassis 153
  MAC address 146
  power supply specifications 333
  powering on (AC) 162
  rear view 146
  removing the chassis from a rack 157
  serial number 146
  SMMi, description 175
Alpine 3806 chassis
  grounding 156
Alpine 3808 switch
  AC power supply 160
  DC cabling 163, 166
  DC power supply 164
  fan tray 142
  fan tray installation 211
  front view 143
  installing the chassis 153
  MAC address 144
  power supply specifications 332
  powering on (AC) 162
  rear view 144
  removing the chassis from a rack 157
  serial number 144
  SMMi, description 175
Alpine switch, general
  agency certifications 330
  components
    Alpine 3802 146
    Alpine 3804 144
    Alpine 3808 142
  ESD, preventing damage 152
  features 139
  grounding 155
  I/O modules 181
    environmental requirements 368

LEDs 202
port connections 140
power supply 140
power-off specifications 333
amperage requirements for UPS 52
amperage, calculating 52
ANSI standards 53
ARM
description 284
diagnostic service ports 285
GPP subsystem 284
LEDs 294
network processors 284
specifications 365
ATM module 290
concatenated mode 290
diagnostic service ports 292
electromagnetic compatibility 367
GPP subsystem 291
LEDs 293
network processors 291
optical interface characteristics 290
optical interfaces
OC-3 multimode 290
OC-3 single-mode 290
specifications 367
automatic failover
setting up 64
Summit 200-24 rules 64
Summit 200-48 rules 64, 65
Summit 300 rules 74
Summit 400-48t rules 80, 85
automatic shutdown 36

B

bend radius
fiber optic cable 46
UTP cable 45
BlackDiamond 6804 switch
110 VAC power supply 229
220 VAC power supply 228
-48 VDC power supply 230
fan tray installation 301
front view 226
installing the chassis 235
MAC address 227
MSM, description 253
rear view 227
removing the chassis from a rack 239
serial number 227
specifications 333, 334
BlackDiamond 6808 switch
110 VAC power supply 229
220 VAC power supply 228
-48 VDC power supply 230
console port 255
fan tray installation 301
front view 223
installing the chassis 235
MAC address 224
MSM, description 253
rear view 224
removing the chassis from a rack 239
serial number 224
specifications 333, 334
BlackDiamond 6816 switch
110 VAC power supply 229
220 VAC power supply 228
-48 VDC power supply 230
console port 255
fan tray installation 301
front view 219
installing the chassis 235
MAC address 221
MSM, description 253
removing the chassis from a rack 239
serial number 221
spacing requirements 31
specifications 333, 334
BlackDiamond switch, general
agency certifications 333
checking the installation 245, 250
components 218
ESD, preventing damage 234
features 215
grounding 238
heat dissipation
110 VAC 335
220 VAC 335
-48 DC 335
I/O modules
configuring 263
environmental requirements 368
LEDs 293
port connections 216
power supply specifications 335
powering on 244, 250
power-off specifications 335
building codes 29
bundling cable 45

C

cable labeling 45
cable manager 45
cable requirements
bend radius
fiber optic 46
UTP 45
meeting 44
cable slack 45
cable types and distances 47
cabling for redundancy 80, 85
cabling standards 44, 53
ANSI 53
BISCI 44
certification marks 316
certifications
Alpine 3800 series switch 330
BlackDiamond 6800 series switch 333
Summit "i" series switch 327
Summit 300-48 power supply 324, 325
chassis
front view
Alpine 3802 147
Alpine 3804 145
Alpine 3808 143
BlackDiamond 6804 226
BlackDiamond 6808 223

BlackDiamond 6816 219
rear view
Alpine 3802 (AC) 149
Alpine 3802 (DC) 149
Alpine 3804 146
Alpine 3808 144
BlackDiamond 6804 227
BlackDiamond 6808 224
checking the installation
Alpine 3802 switch (DC) 168
BlackDiamond switch 245, 250
Summit switch 114
Class 1 laser device (warning) 311
combination ports
defined 80, 85
Summit 200 64
Summit 300 74
Summit 400-24 75, 80
Summit 400-48t 80, 85
commands
clear log static 257
configure switch 147
show memory 87
synchronize 260
commercial building standards 53
compact flash 82
components
Alpine 3802 switch 146
Alpine 3804 switch 144
Alpine 3808 switch 142
BlackDiamond 6804 switch 225
BlackDiamond 6808 switch 222
BlackDiamond 6816 switch 218
concatenated mode, PoS module 280
configuring IP settings 306
connectors
diagnostic service ports
ARM 285
ATM module 292
MPLS module 288
PoS module 282
RJ-21 361
console connector 316
console port
MSM 255
settings 305
SMMi 176
Summit 200 switch 63
Summit 300-24 switch 69
Summit 300-48 switch 72
Summit 400 switch 81
Summit1i switch 89
Summit48i switch 99
Summit48si switch 101
Summit5i switch 92
Summit7i switch 95
conventions, text 14
cross-module trunking 255
CX4 XENPAK 348

D

DC cabling
Alpine 3802 switch
attaching 168
selecting 167
Alpine 3804 switch
attaching 163, 166
selecting 163
Alpine 3808 switch
attaching 163, 166
selecting 163
BlackDiamond 6800 series switch
attaching 135, 249
power lugs 230
preparing 248
selecting 248
DC power requirements 51
DC power supply, removing
Alpine 3800 170
BlackDiamond 6800 251
dimensions
Alpine 3800 series switch 331
ARM 365
ATM module 367
BlackDiamond 6800 series switch 334
F32Fi module 363
F48Ti module 360
F96Ti module 360
FM-24MFi module 352
FM-24SFi module 352
FM-24Ti module 351
FM-32Ti module 351
FM-8Vi module 353
G12SXi module 358
G16X3 module 359
G24T3 module 359
G8Ti module 358
G8Xi module 358
GM-16T3 module 350
GM-16X3 module 350
GM-4Si module 348
GM-4Ti module 348
GM-4Xi module 348
MPLS module 366
MSM 357
PoS module 364
SMMi module 348
Summit 200-24 switch 321
Summit 200-24fx switch 322
Summit 200-24fx-TAA switch 322
Summit 200-48 switch 321
Summit 300-24 switch 323
Summit 300-48 switch 323
Summit 400-24p switch 326
Summit 400-24t switch 326
Summit 400-48t switch 327
Summit1i switch 328
Summit48i switch 328
Summit48si switch 329
Summit5i switch 328
Summit7i switch 328
WM-1T3i module 356
WM-4E1i module 355
WM-4T1i module 355
DIMMs
Alpine 176
BlackDiamond 256
dual 10 Gigabit uplinks

location on Summit 400 82
dual uplink ports
Summit 200 switches 60
Summit 300-24 switch 66
Summit 300-48 switch 70
Summit 400-24 switch 80
Summit 400-48t switch 85

E

electrical codes 29
electromagnetic compatibility
Alpine 3800 series switch 331
ARM 365
ATM module 367
BlackDiamond 6800 series switch 333
F32Fi module 363
F48Ti module 360
F96Ti module 360
FM-24MFi module 352
FM-24SFi module 352
FM-24Ti module 351
FM-32Ti module 351
FM-8Vi module 353
G12SXi module 358
G16X3 module 359
G24T3 module 359
G8Ti module 358
G8Xi module 358
GM-16T3 module 350
GM-16X3 module 350
GM-4Si module 349
GM-4Ti module 349
GM-4Xi module 349
MPLS module 366
MSM 357
PoS module 364
SMMi module 348
Summit "i" series switch 327
Summit 300-48 power supply 325
WM-1T3i module 356
WM-4E1i module 355
WM-4T1i module 355
electrostatic discharge. *See ESD*
environmental requirements, general 30
environmental standard
ARM 365
F32Fi module 363
F48Ti module 360
F96Ti module 360
FM-24MFi module 352
FM-24SFi module 352
FM-24Ti module 351
FM-32Ti module 351
FM-8Vi module 353
G12SXi module 358
G16X3 module 359
G24T3 module 359
G8Ti module 358
G8Xi module 358
GM-16T3 module 350
GM-16X3 module 350
GM-4Si module 349
GM-4Ti module 349
GM-4Xi module 349
MPLS module 366
MSM 357
PoS module 364
SMMi module 348
Summit 200 and 300 switches 315
Summit 300 series switches 322
WM-1T3i module 356
WM-4E1i module 355
WM-4T1i module 355
EPS-160 power supply 124
EPS-LD external power cable 172, 196
EPS-LD External Power Supply
connecting to FPM-32Pi module 196
for Alpine switches 171, 206
for Summit switches 118
EPS-T 124
equipment rack
mechanical recommendations 39
requirements 40
ER XENPAK 345, 377
ESD 38, 46
ESD wrist strap 38
external power cable 172, 196
External Power Supply EPS-LD
connecting to FPM-32Pi module 196
for Alpine switches 171, 206
for Summit switches 118
External Power System 86, 124

F

F32Fi module
description 279
specifications 363
F48Ti module
description 275
specifications 360
F96Ti module
connector 361
description 276
specifications 360
fan status LED
Summit 200 switches 63
Summit 300-24 switch 68
Summit 300-48 switch 71
Summit 400-24 switch 78
Summit 400-48t switch 83
fan tray
installing in a BlackDiamond 6800 series switch 301
installing in a BlackDiamond 6808 switch 301
installing in a BlackDiamond 6816 switch 301
installing in an Alpine 3808 or 3808 switch 211
removing from a BlackDiamond 6800 series switch 300
removing from an Alpine 3804 or 3808 switch 209
features
Alpine 3800 series switch 139
BlackDiamond 6800 series switch 215
Summit 200 switches 60
Summit 300 switches 66
Summit 400-24 switches 75
Summit 400-48t switch 80
Summit48i switch 98
Summit48si switch 100
Summit5i switch 91
Summit7i switch 94

fiber optic cable
bend radius 46
care 46
fiber port status LEDs
Summit 200 switches 63
Summit 300-24 switch 69
Summit 300-48 switch 72
Summit 400-24 switch 79
Summit 400-48t switch 84
FM-24MFi module
description 194
specifications 352
FM-24SFi module
description 193
specifications 352
FM-24Ti module
description 191
specifications 351
FM-32Pi module 196
FM-32Ti module
description 195
specifications 351
FM-8Vi module
description 198
specifications 353
free-standing installation, Summit switch 112
full-duplex 22
Summit 200 switches 65
Summit 300-24 switch 69
Summit 300-48 switch 73
Summit 400-24 switch 80
Summit 400-48t switch 84
fuse, changing in a Summit switch 311

G

G12SXi module
description 269
specifications 358
G16X3 module
description 270
specifications 359
G24T3 module
description 273
specifications 359
G8Ti module 266
specifications 358
G8Xi module
description 267
specifications 358
GBIC
identifying ZX GBIC Rev 03 341
installing 372
long range system budgets 54
LX100 requirements 370
removing 372
safety 371
specifications
LX 341
LX100 342
LX70 342
SX 341
UTP GBIC 343
ZX GBIC 342
ZX GBIC Rev 03 342
types 23
UTP requirements 370
GM-16T3 module
description 189
specifications 350
GM-16X3 module
description 187
specifications 350
GM-4Si module 186
specifications 348
GM-4Ti module
description 183
specifications 348
GM-4Xi module
description 184
specifications 348
GPP subsystem
ARM 284
ATM module 291
MPLS module 287
PoS module 280
grounding 53
Alpine chassis 155
BlackDiamond chassis 238
equipment rack 40
grounding the rack 40

H

hardware address
Alpine 3802 switch 149, 150
Alpine 3804 switch 146
Alpine 3808 switch 144
BlackDiamond 6804 switch 227
BlackDiamond 6808 switch 224
BlackDiamond 6816 switch 221
Summit 300-24 switch 67
Summit 300-48 switch 71
Summit 400-24 switch 77
Summit 400-48t switch 82
Summit1i switch 90
Summit48i switch 100
Summit48si switch 104
Summit5i switch 93
Summit7i switch 97
heat dissipation
Alpine 3800 series switch 332
BlackDiamond switch 110 VAC 335
BlackDiamond switch 220 VAC 335
BlackDiamond switch -48 DC 335
Summit “i” series switches 329
Summit 200-24 switch 321
Summit 200-24fx switch 322
Summit 200-24fx-TAA switch 322
Summit 200-48 switch 321
Summit 300 switches 322
Summit 300-24 switch 323
Summit 400-24p switch 326
Summit 400-24t switch 326
Summit 400-48t switch 327
helper bracket
Alpine switch 153
BlackDiamond switch 235
Summit switch 108
high-performance stacking ports

Summit 400-24 switches 77
Summit 400-48t switch 82
hot insert power supply, Summit48si switch 103
humidity restrictions 36

I

I/O modules, Alpine
description 181
environmental requirements 368
hot-swapping 204, 206
installing 204
LEDs 202
removing 207
verifying the installation 205
I/O modules, BlackDiamond
description 263
environmental requirements 368
hot-swapping 294, 296
installing 294
LEDs 293
removing 296
verifying the installation 295
identification, cable 45
identifying ZX GBIC Rev 03 341
industry design standards 53
installation
AC power supply, Alpine switch 160
Alpine 3802 chassis 153
Alpine 3804 chassis 153
Alpine 3804 or 3808 fan tray 211
Alpine 3808 chassis 153
Alpine I/O modules 204
BlackDiamond 6800 series power supplies 243, 250
BlackDiamond 6804 chassis 235
BlackDiamond 6808 chassis 235
BlackDiamond 6808 switch fan tray 301
BlackDiamond 6816 chassis 235
BlackDiamond 6816 switch fan tray 301
BlackDiamond I/O modules 294
connecting network interface cables 49
DC power supply, Alpine switch 164
GBIC 372
helper bracket
Alpine switch 153
BlackDiamond switch 235
Summit switch 108
mini-GBIC 374
MSM 257
optional hardware 86
slave MSM 260
SMMi module 177
Summit switch
free-standing 112
rack-mount 108
installing cable 45
bend radius
fiber optic 46
UTP 45
cable distances 47
fiber optic cable 46
slack 45
internal power supply for Summit 300-48 121
IP settings, configuring 306

L

labeling system for cables 45
LED error
mini-GBIC 375
LEDs
Alpine 3800 series switch power supply 141
Alpine 3802 switch 148
Alpine I/O modules 202
ARM 294
ATM module 293
BlackDiamond 6800 series switch
110 VAC power supply 230
220 VAC power supply, 229
-48 VDC power supply, 231
BlackDiamond I/O modules 293
MPLS module 294
MSM 257
PoS module 293
SMMi 176
Summit “i” series switch 97
Summit 200-24 switch 63
Summit 200-48 switch 63
Summit 300-24 switch 67
Summit 400-24 switch 77
Summit 400-24 switches 78
Summit 400-48t management port 85
Summit 400-48t switch 82, 83
Summit1i switch 89
Summit48si switch 105
load sharing, power supplies 73
LR XENPAK 345, 377
LX100 GBIC requirements 370
LX4 XENPAK 347

M

MAC address
Alpine 3802 switch 149, 150
Alpine 3804 switch 146
Alpine 3808 switch 144
BlackDiamond 6804 switch 227
BlackDiamond 6808 switch 224
BlackDiamond 6816 switch 221
Summit 300-24 switch 67
Summit 400-24 switch 77
Summit 400-48t switch 82
Summit1i switch 90
Summit48i switch 100
Summit48si switch 104
Summit5i switch 93
Summit7i switch 97
management port
description 22
MSM 255
SMMi module 176
Summit 400-48t 82
Summit5i switch 94
Summit7i switch 96
Management Switch Fabric Module. *See* MSM64i module
mechanical recommendations for rack 39
media types and distances 47
memory
MSM 256
SMMi module 176
memory size, determining 87

MGMT LED on Summit 400-48t 83
mini-GBIC 23, 373
installing 374
LED error 375
optical budget 54
removing 375
safety 373
specifications
1000BX 344
LX 343
SZ 343
ZX 344
modem port
Alpine 3802 switch 176
BlackDiamond 6800 switch 255
Summit7i switch 96
MPLS module
description 287
diagnostic service ports 288
GPP subsystem 287
LEDs 294
network processors 287
specifications 366
MSM
booting 256
console port 255
description 217, 253
hot-swapping 257
installing 257
LEDs 257
management port 255
master, slave functionality 255
memory 256
ports 255
removing 261
saving configuration 256
specifications 357
tools, installation 257
tools, removal 260
verifying the installation 260
Multi Protocol Label Switching Module, *See* MPLS module

N

network processors
ARM 284
ATM module 291
MPLS module 287
PoS module 280
notice icons 14

O

OC-3/OC-12 optical interfaces 280
on/off switch, Alpine 3802 DC switch 150
operating environment requirements 29
optical budget 54
optical interfaces 311
optical safety precautions 311
optical-fiber cable connections 49
optional hardware features 86
overheating 36, 37

P

P12cMi module. *See* PoS module
P12cSi module. *See* PoS module
P3cMi module. *See* PoS module
P3cSi module. *See* PoS module
physical specifications
Alpine 3800 series switch 332
BlackDiamond 6800 series switch 334
Summit 200-24 switch 321
Summit 200-24fx switch 322
Summit 200-24fx-TAA switch 322
Summit 200-48 switch 321
Summit 400-48t switch 327
Summit1i switch 328
Summit48i switch 328
Summit48si switch 329
Summit5i switch 328
Summit7i switch 328
pinouts
console connector 316
null-modem cable 317
redundant power connector 337
RJ-21 connector 361
plenum-rated cable 45
PoE modules, external power supply for 171, 206
PoE ports, providing redundant power to 171
port connections
Alpine 3802 switch 147
Alpine 3804 switch 145
Alpine 3808 switch 142
Alpine switches 140
BlackDiamond 6800 switches 216
BlackDiamond 6804 switch 225
BlackDiamond 6808 switch 222
BlackDiamond 6816 switch 218
Summit “i” series switches 87
Summit 200 switches 64
Summit 300-24 switch 69
Summit 300-48 switch 72
Summit 400-24 switch 79
Summit 400-48t switch 84
port status LEDs
Alpine I/O Module 203
Alpine I/O module 203
Alpine PoE modules 204
BlackDiamond ATM modules 293
BlackDiamond I/O modules 293
BlackDiamond PoS modules 293
Summit 200 switches 63
Summit 300-24 switch 68
Summit 300-48 switch 72
Summit 400-24 switch 79
Summit 400-48t switch 84
ports
console port settings 305
MSM 255
stacking 77, 82
PoS module
description 280
diagnostic service ports 282
GPP subsystem 280
LEDs 293
network processors 280
OC-3/OC-12 interfaces 280
optical interfaces 280
specifications 364

power cable retaining bracket
  installing 129
  loosening for cable removal 132
power cable, external
  Alpine PoE module 196
  connecting 172
power requirements
  dual power supplies 50
  general 49
  power cable 50
  power supply 49
power socket
  Summit 200 switches 62
  Summit 300-24 switch 67
  Summit 300-48 switch 71
  Summit 400-24 switch 77
  Summit 400-48t switch 82
  Summit1i switch 90
  Summit48i switch 99
  Summit48si switch 103
  Summit5i switch 93
  Summit7i switch 97
power specifications
  Alpine switches 332
  BlackDiamond 6800 switches 335
  EPS-160 power supply 325
  EPS-LD 336
  Summit 300 switches 322
  Summit 300-48 switch 323
  Summit 400-24p switch 326
  Summit 400-24t switch 326
  Summit 400-48t switch 327
  Summit48i switch 330
power supply
  Alpine 3800 series switch
    LEDs 141
    voltage 140
  Alpine 3804 switch
    installing, AC power supply 160
    installing, DC power supply 164
    removing, AC power supply 169
    removing, DC power supply 170
  Alpine 3808 switch
    installing, AC power supply 160
    installing, DC power supply 164
    removing, AC power supply 169
    removing, DC power supply 170
  BlackDiamond 6800 series switch
    110 VAC 229
    220 VAC 228
    -48 VDC 230
    installing 243, 250
    LEDs 229, 230, 231
    removing AC supply 246
    removing DC supply 251
  external installation 86, 124
  load sharing 73
  Summit 5i switch 93
  Summit1i switch 90
  Summit48i switch 99
  Summit48si switch 103
  Summit7i switch 97
power supply LEDs
  Summit 300-24 68
  Summit 300-48 72
  Summit 400-24 switch 78
  Summit 400-48t switch 83
power supply specifications
  Alpine switches 332
  BlackDiamond 6800 series switch 335
  EPS-LD 325, 336
  Summit 200 switches 321, 322
  Summit 300 switches 322
  Summit 300-48 switch 323
  Summit 400-48t switch 327
  Summit1i switch 329
  Summit48si DC supply 330
  Summit48si switch 330
  Summit5i switch 329
  Summit7i switch 329
powered device types (PoE) 66
powering on the switch
  Alpine 3804 (AC) 162
  Alpine 3808 (AC) 162
  BlackDiamond 6800 series 244, 250
  Summit switches 111
power-off specifications
  Alpine 3800 series switch 333
  BlackDiamond 6800 series switch 335
  Summit “i” series switches 330
  Summit 300-24 switch 323
  Summit48i switch 330
  Summit7i switch 330
power-on self test (POST)
  Alpine 3802 switch (DC) 168
  BlackDiamond 6800 series switch 245, 250
  Summit switch 114

R

rack grounding 40
rack specifications 39
rack-mounting
  Alpine 3800 series chassis 153
  BlackDiamond 6800 series chassis 235
  Summit switch 108
radio frequency interference
  installing cable 45
  precautions 48
redundant Gigabit uplink port
  Summit 200-24 rules 64
  Summit 200-48 rules 64, 65
  Summit 300 rules 74
  Summit 400 rules 80, 85
redundant power for PoE ports 118, 171
redundant power installation
  EPS-160 124
  EPS-LD
    Alpine switch 171
    Summit switch 118
related publications 15
removal
  Alpine AC power supply 169
  Alpine DC power supply 170
removing
  Alpine AC power supply 169
  Alpine DC power supply 170
  EPS-160 power supply 126
  EPS-LD power supply 121, 174

GBIC 372
mini-GBIC 375
Summit 300-48 power supply 123
Summit 48si AC power supply 128
XENPAK modules 381
requirements
DC cable 134
DC cables 163, 249
DC power 51
RJ-45 connectors 48
service access 40
UTP GBC 370
reset button
Summit1i switch 90
Summit48i switch 100
Summit48si switch 104
Summit5i switch 93
Summit7i switch 96
RJ-21
pinouts 361
port 361
RJ-21 connector 361
RJ-45 connector jackets 48
running cable 45
bend radius
fiber optic 46
UTP 45
cable distances 47
fiber optic cable 46
slack 45

S

safety certifications 324
Alpine 3800 series switch 330
BlackDiamond 6800 series switch 333
Summit “i” series switch 327
safety information 309
safety specifications 324
saving MSM configuration 256
securing the rack 40
selecting an uninterruptable power supply 52
serial number
Alpine 3802 switch 149, 150
Alpine 3804 switch 146
Alpine 3808 switch 144
BlackDiamond 6804 switch 227
BlackDiamond 6808 224
BlackDiamond 6816 switch 221
Summit 200 switches 62
Summit 300-24 switch 67
Summit 300-48 switch 71
Summit 400-24 switch 77
Summit 400-48t switch 82
Summit1i switch 90
Summit48i switch 100
Summit48si switch 104
Summit5i switch 91, 93
Summit71 switch 97
serial port. *See* console port
service access requirements 40
service access to the rack 40
shutdown, automatic 36
site planning process 28
slave MSM
installing 260
switchover 256
SMMi module
console port 176
description 175
hot-swapping 177
installing 177
LEDs 176
management port 176
memory 176
removing 178
specifications 348
tools, installation 177
tools, removal 178
verifying the installation 178
socket, AC power
Summit 200 switches 62
Summit 300-24 switch 67
Summit 300-48 switch 71
Summit 400-24 switches 77
Summit 400-48t switch 82
Summit1i switch 90
Summit48i switch 99
Summit48si switch 103
Summit5i switch 93
Summit7i switch 97
space requirements 40
SR XENPAK 345, 377
stacking
calculating limits 42
dedicated ports 79
maximum in the stack 41
planning 41
ports 82
typical configuration 112
standards 53
Summit “i” series switches 87
Summit 200 switch
specifications, common 318
Summit 200 switches
automatic failover 64
LEDs 63
physical description 61
port connections 64
Summit 200-24 switch
front view 61
LEDs 63
rear view 61
serial number 62
specifications 321
Summit 200-24fx switch
specifications 322
Summit 200-24fx-TAA switch
specifications 322
Summit 200-48 switch
front view 62
LEDs 63
rear view 62
serial number 62
specifications 321
Summit 300 switches
specifications, common 322
Summit 300-24 switch
console port 69

front view 67
MAC address 67
port connections 69
rear view 67
specifications 323
Summit 300-48 switch
console port 72
front view 70
load sharing power supplies 73
port connections 72
rear view 71
specifications 323
Summit 400 switches
LEDs 83
Summit 400-24 switches
AC power socket 77
LEDs 78
physical description 75
port connections 79
Summit 400-24p switch
front view 76
LEDs 78
rear view 77
specifications 326
Summit 400-24t switch
front view 76
LEDs 78
rear view 76
specifications 326
Summit 400-48t switch
AC power socket 82
front view 81
LEDs 82, 83
physical description 80
port connections 84
rear view 82
specifications 327
Summit switch, general
checking the installation 114
models 59
powering on 111
rack-mounting 108
removing the switch from a rack 115
stacking with other devices 112
Summit XEN card 378
Summit1i switch
console port location 89
front view 88, 89
GBIC support 89
LEDs 89, 97
MAC address 90
port configurations 88
power supply 90
rear view 89
reset button 90
serial number 90
specifications 327
Summit48i switch
console port location 99
front view 98
GBIC support 99
LEDs 97, 99
MAC address 100
port configurations 98
power supply 99
rear view 99
reset button 100
serial number 100
specifications 327
Summit48si switch
bottom view 102
console port location 101
front view 101
LEDs 102, 105
MAC address 104
mini-GBIC support 103
port configurations 100
power supply 103
rear view 101
reset button 104
serial number 104
specifications 327
Summit5i switch
console port location 92
front view 91
GBIC support 93
LEDs 92, 97
MAC address 93
management port 94
port configurations 91
power supply 93
rear view 92
reset button 93
serial number 93
specifications 327
Summit7i switch
console port location 95
front view 94, 95
GBIC support 96
LEDs 96, 97
MAC address 97
management port 96
modem port 96
port configurations 94
power supply 97
rear view 95
reset button 96
serial number 97
specifications 327
Switch Management Module. *See* SMMi module
system alarms, overheating 37
system budgets, long range GBICs 54

T

telecommunications standard
Alpine 3800 series switch 331
ARM 365
ATM module 367
BlackDiamond 6800 series switch 333
F32Fi module 363
F48Ti module 360
F96Ti module 360
FM-24MFi module 352
FM-24SFi module 352
FM-24Ti module 351
FM-32Ti module 351
FM-8Vi module 353
G12SXi module 358

G8Ti module 358
G8Xi module 358
GM-4Si module 349
GM-4Ti module 349
GM-4Xi module 349
MPLS module 366
MSM 357
PoS module 364
SMMi module 348
WM-1T3i module 356
WM-4E1i module 355
WM-4T1i module 355
temperature
monitoring 36
wiring closet 30
text conventions 15
tools
Alpine 3800 series fan tray installation 211
Alpine 3800 series rack installation 152
Alpine 3800 series rack removal 157
Alpine 3804 AC power supply 160
Alpine 3804 DC power supply 133, 164
Alpine 3804 fan tray removal 209
Alpine 3808 AC power supply 160
Alpine 3808 DC power supply 133, 164
Alpine 3808 fan tray removal 209
Alpine I/O module installation 204
Alpine I/O module removal 206
BlackDiamond 6800 series chassis rack installation 235
BlackDiamond 6800 series chassis rack removal 239
BlackDiamond 6800 series power supply 241
BlackDiamond I/O module installation 294
MSM installation 257
MSM removal 260
SMMi installation 177
SMMi removal 178
Summit switch rack installation 108
Summit switch rack removal 115
transition time, uninterruptable power supply 53
trunking, cross-module 255

U

uninstalling, rack
Alpine 3800 series chassis 157
BlackDiamond 6800 series chassis 239
Summit switch 115
uninterruptable power supply 52 to 53
uplink redundancy
setting up 64
Summit 200-24 rules 64
Summit 200-48 rules 64
Summit 300 switches 74
Summit-400 switch 80, 85
UPS, *See* uninterruptable power supply
UTP cable bend radius 45
UTP GBIC requirements 370

W

weight
ARM 365
ATM module 367
BlackDiamond 6804 switch 335
BlackDiamond 6808 switch 334
BlackDiamond 6816 switch 334
F32Fi module 363
F48Ti module 360
F96Ti module 360
FM-24MFi module 352
FM-24SFi module 352
FM-24Ti module 351
FM-32Ti module 351
FM-8Vi module 353
G12SXi module 358
G16X3 module 359
G24T3 module 359
G8Ti module 358
G8Xi module 358
GM-16T3 module 350
GM-16X3 module 350
GM-4Si module 348
GM-4Ti module 348
GM-4Xi module 348
MPLS module 366
MSM 357
PoS module 364
SMMi module 348
Summit 200-24 321
Summit 200-24fx 322
Summit 200-24fx-TAA 322
Summit 200-48 switch 321
Summit 300-24 switch 323
Summit 400-24p switch 326
Summit 400-24t switch 326
Summit 400-48t switch 327
Summit1i switch 328
Summit48i switch 328
Summit48si switch 329
Summit5i switch 328
Summit7i switch 328
WM-1T3i module 356
WM-4E1i module 355
WM-4T1i module 355
wiring closet
airflow requirements 31
BlackDiamond 6816 switch installation 31
electrostatic discharge 38
floor covering 30
grounding 30
humidity 36
temperature 30
wiring terminals 40
WM-1T3i module
description 202
LEDs 202
specifications 356
WM-4E1i module
description 201
LEDs 201
specifications 355
WM-4T1i module
description 200
LEDs 200
specifications 355

X

XENPAK 344
CX4 XENPAK 348

ER XENPAK 345
LR XENPAK 345
LX4 XENPAK 347
SR XENPAK 345
ZR XENPAK 346
XENPAK module
installation 297
supported types 377

Z

ZR XENPAK 346, 377